

COMPUTERWORLD

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WE'RE HISTORY!

99

Four decades of reporting on technology—and the IT Leaders putting it to work in their corporations—gives *Computerworld* a unique view of the past, an experienced perspective on the present, and a singular vision of the future.

At *Computerworld*, IT Leaders have always come first. If we're not meeting their needs, we're not doing our job. That's why we undertook an exhaustive program of quantitative and qualitative research before making the changes you'll see in this issue.

Strapped for reading time, squeezed by competitive business pressure and hungry for peer insight, IT Leaders told us that they need the most value in the least time. So we responded with a bold new layout

that recalls the newspaper's origins while reflecting IT Leaders' dual interests in business and technology.

News, Business, Technology—three newspaper sections provide a filter-on-the-fly system for busy IT Leaders. Detailed tables of contents, company indexes, links to online resources and peer contact information enhance navigability. And new typefaces make it all easier to read, too.

As businesses have embraced technology as a competitive management tool, *Computerworld* has continuously evolved its coverage to meet the needs of IT Leaders running strategic operations. Through the eyes of IT Leaders, *Computerworld* documents history in the making.





News. Business. Technology. Computerworld Covers the Critical Bases for IT Leaders.

IT Leaders, those men and women charged with making businesses more competitive or more efficient through technology, are under a lot of pressure. Budgets. Return on investment. Deadlines. Performance issues. Platform compatibility. Electronic commerce. Year 2000 contingency planning. Recruitment and retention. IT Leaders are in the spotlight and on the hot seat at the same time.

In dozens of face-to-face interviews, through hundreds of surveys and phone polls, and in focus groups, Computerworld probed IT Leaders regarding their biggest challenges, their ambitions and their information needs. The 1999 makeover reflects advice voiced to us by hundreds of people.

News in Context, Not Just the Facts.

IT Leaders tell us they expect urgency and advocacy from Computerworld. That's why you see front page coverage that runs the gamut from how the latest corporate mega-merger affects data management to the latest practices in personnel recruitment (yes, signing bonuses work). Computerworld injects the IT Leader's perspective into every story with quotes, surveys and on-site business reporting.

Truth, Authority, Relevance

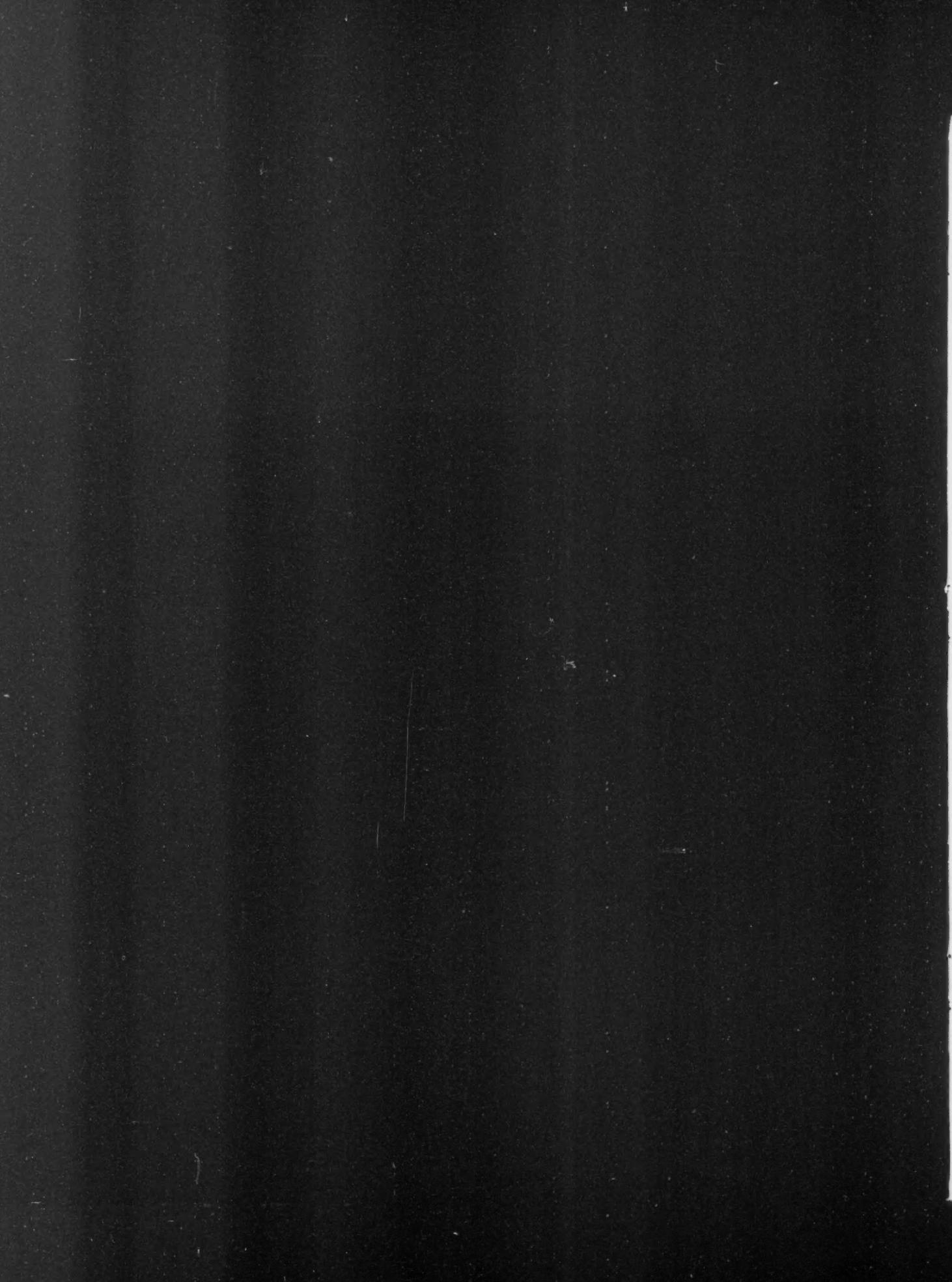
When news breaks, Computerworld's editors are there. Not just in the pages of Computerworld, but via Computerworld online and on broadcast news reports coast to coast. No other team of editors is in more demand by the business and consumer media.

Business is Where IT Leaders Live.

Intelligence on how other IT Leaders are doing, what their successes are—and what pitfalls to avoid—is essential to Computerworld readers. In the last few years, Computerworld has nearly doubled its coverage of business and management issues. Now you can find related features—case studies, best practices, how-to's on working the system (and the CEO)—in the Computerworld Business section.

Brevity and Depth

IT Leaders asked for shorter bites of information and longer, more in-depth stories, too. So, Computerworld has increased use of news briefs and significantly expanded indexing in all three sections. As for depth, Computerworld continues to devote space to stories that deserve extra ink. For even greater story detail, boxes marked "More Online" lead to resources that add value to features and section departments. (Check "Resources" at www.computerworld.com for updated QuickStudy guides to technology, a Year 2000 resource database and issue-related research links.)



BEGINNING THIS WEEK:

■ CAREER ADVISER: National expert Fran Quittel answers readers' questions about careers. Page 66

■ HOW FAR WE'VE COME: Celebrating the millennium with a look at a half-century of achievement. Page 88

■ GUIDE TO OUR NEW LOOK: Where to find what you need. Page 3

COMPUTERWORLD

THE NEWSPAPER FOR IT LEADERS • WWW.COMPUTERWORLD.COM

JANUARY 11, 1999 • VOL. 35 • NO. 2 • \$4. COPY

Y2K FREEZE SPURS PUSH TO UPGRADE

Users advised to lay away added capacity and storage; vendors could be accommodating

BY JAIKUMAR VIJAYAN

With a year 2000-driven freeze on system changes expected at many IT shops later this year, mainframe users looking at processor or storage upgrades may want to sock away some extra computing power.

Having additional capacity now could ease upgrade pains later, when companies are expected to impose third- and fourth-quarter freezes on all system changes, according to Meta Group Inc., a Stamford, Conn.-based consultancy.

Companies should think about acquiring "dormant" capacity — such as spare proces-

sors in the box or extra storage strings — and turning it on as needed, said Carl Greiner, an analyst and author of the Meta report.

Another factor: Vendors faced with the prospect of a weak second half might be willing to negotiate with customers to front-load the extra hardware capacity for free now — and then have customers pay for it on an as-you-go basis, Greiner predicted.

Buying extra headroom now makes sense in theory, said Jim Lackey, a software configuration manager at Information Y2K Freeze, page 113

AS RETAILERS MERGE, IT TAKES A BIG MARKDOWN

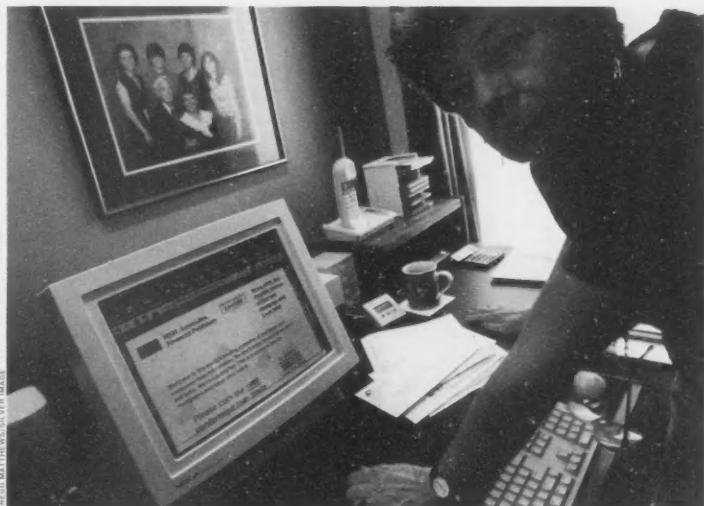
IT-lean Ames buys Hills, kills ERP project

BY DAVID ORENSTEIN

When Ames Department Stores Inc. took over Hills Stores Co. on Dec. 31, Ames made two decisions immediately clear: There was little

room for Hills' IT staff, and there was no need at all for an \$80 million enterprise resource planning system that Hills began deploying three years ago.

In three waves over the next six months, Ames will migrate Hills' stores to its year-old, \$35 million, Windows NT 4.0-based client/server in-store systems, said CIO Paul Lanham. At headquarters, Ames simply will extend the capacity of its IBM LMS mainframe systems and applications. "All of a Retailers, page 113



FLORIDA RETIREE GLORIA McCABE thought she could point and click her way to a new mortgage on the Web. No such luck; inflexible electronic application forms couldn't handle her needs

FALSE PROMISE

TO LISTEN TO THE ADS, you'd think you could get a mortgage online with just a flurry of mouse clicks. But behind the snazzy Web sites, the process quickly bogs down in the same old paperwork and telephone tag with loan agents. Many players in the mortgage industry are still wedded to

paper forms, making it hard to automate the transaction from start to finish. In Computerworld's new Business section, technology editor Robert L. Scheier reports on where the process breaks down — and how some of the biggest Web mortgage players hope to make money anyway.

Report starts on page 52

U.S. FIRMS GIRD FOR PRIVACY RULES

Practices face scrutiny on two continents

BY SHARON MACHLIS

Governments on both sides of the Atlantic are focusing on computer privacy practices this year. And that could have

major implications for the way U.S. companies handle data and interact with consumers online — especially for businesses enticed to expand their European operations in light of the launch of the new euro currency.

In the U.S., the Federal Trade

Commission expects to participate in another sweep of U.S. Web sites, probably in March, to see if there has been progress on posting adequate privacy policies. The government wants consumers to know how their personal information is being used.

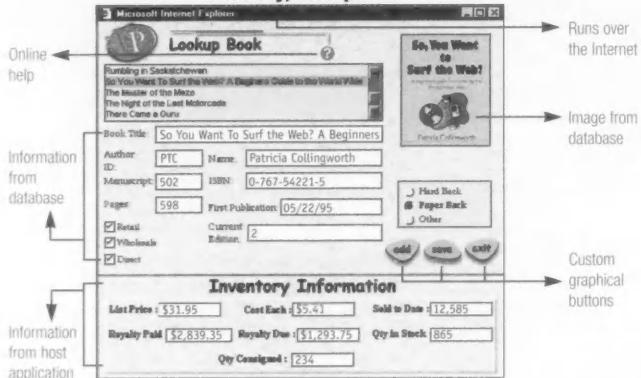
"Anything that will bolster consumer confidence is going Privacy Rules, page 16

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CHIPPING IN

Kevin Warwick volunteered to become the first known recipient of a microprocessor implant. Better him than you. - Page 89



WEST COASTIN'

Our list of the top 10 cities for IT job seekers includes San Francisco. Check out the other hot spots - Page 64



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To our readers

This week *Computerworld* introduces a new design that improves readability and groups similar content together around three sections: NEWS, BUSINESS and TECHNOLOGY.

The NEWS section has more briefs and shorter news items. We have also added a page of business news about the computer industry. Page 4

Our new BUSINESS section is now home to the Managing and IT Careers departments. Weekly E-commerce and Year 2000 departments will also appear here. Page 37

The TECHNOLOGY section now encompasses several departments that previously stood alone. They include the QuickStudy, Software, Networks and Hardware departments. Page 71

Frank Hayes' *Frankly Speaking* column also can be found in Technology, on page 82. Review Center is now called Field Report; it appears in the Technology section on page 91. Finally, the Skills Scope feature on IT careers can be found at the end of the Technology section on page 97.

Also new this issue is Career Adviser (page 66), a bimonthly advice column; and Flashback (page 88), a yearlong retrospective on the last 50 years of computing. For a fuller explanation of the changes, see page 30.

The redesign was developed with Roger Black Inc. of New York

AT DEADLINE

Sun's Community Source License

Sun Microsystems Inc. this month will make available the Community Source License it announced last month, a spokesman said. Sun has said that anyone will be able to use source code without any upfront fee and without having to turn over innovations to Sun, though some developers have criticized the plan at the site www.javalobby.com.

Ford Outsourcing Targets Applications

Ford Motor Co. has signed a multi-year services contract with Compuware Corp. for maintenance and support of 1,400 applications in areas that include manufacturing and purchasing. The pact will enable Ford to redeploy IT personnel in strategic business development roles, Compuware said.

Compaq Bundles Net Products With PCs

Compaq Computer Corp. said last week that it will reorganize its networking division to focus on providing its remote access servers, network interface cards and modems in bundles with its PCs and servers.

Bay Patent Suit Dismissed

Bay Networks Inc. last week announced that a patent infringement lawsuit filed against it in 1996 by Datapoint Corp. has been dismissed. Datapoint had sued Bay for alleged infringement of two patents covering Fast Ethernet technology.

Sybase Layoffs

Sybase Inc. has trimmed its workforce by 400 people over the past three months as part of a realignment, a company spokeswoman said Friday. The database company, which posted \$147 million in losses over its last four fiscal quarters, cut more than 1,100 jobs last year, close to 20% of its workforce.

HOLIDAY NET SPREE ENCOURAGES RETAILERS

Threefold increase in average spending, only minor glitches, bode well for 1999

BY SHARON MACHLIS

THE HEFTY rise in online holiday shopping bodes well for '99. Internet retailers say — especially with an influx of first-time shoppers and a trend toward bigger purchases.

"The holiday was great," said Judy Neuman, vice president of interactive media at Eddie Bauer Inc. in Redmond, Wash. She said she expects a strong carryover, with January sales likely to be as high as November's, when the holiday shopping frenzy first kicked off. The Web site is making money.

Amazon.com Inc. in Seattle said it hit \$250 million in sales in the fourth quarter, including a million first-time customers, and holiday sales quadrupled over 1997. The higher sales won't lessen the company's red ink in the fourth quarter, though, executives warned.

America Online Inc. in Dulles, Va., said its members spent more than \$1 billion at retailers available through

AOL — with about 1.25 million users making first-time buys.

Overall, analysts say Inter-

net shopping will exceed expectations," said David Pecaut, senior vice president at the company's Toronto office, which surveyed more than 100 major retailers in conjunction with the trade group Shop.org.

Zona Research Inc. in Red-

complained about occasional trouble reaching the Toys R Us Inc. Web site.

Delhagen characterized such incidents as "a couple of black eyes, but not major . . . not a deal-breaker."

Although there were complaints about customer service, Delhagen pointed out that most physical-world retailers also strain to adequately serve their shoppers in the last two weeks of December.

Hard data about online gift returns isn't out yet, but "I haven't heard any horror stories," she said. "It's hard to gauge. I'm sure there were some problems. . . . The industry is learning a lot in real time."

Sites with the most sophisticated systems integration and multiple channels, such as Eddie Bauer, allow shoppers to buy an item online but return it at a local store — and get their accounts credited on the spot.

Other companies can't access a customer's online order history in a store. ▀

Clicking Till They Drop

Estimates of 1998 holiday shopping revenue for online merchants

| | |
|-----------------------------|----------|
| BizRate.com | \$1.96B* |
| Boston Consulting Group | \$4B** |
| Forrester Research Inc. | \$3.5B** |
| Jupiter Communications Inc. | \$3.2B** |

* Nov. 26 to Jan. 3 ** Entire fourth quarter *** Nov. 1 to Dec. 31

net holiday shopping met or exceeded their projections. Forrester Research Inc. in Cambridge, Mass., had forecast \$3.5 billion in consumer online spending in the fourth quarter.

"We believe that's on target, perhaps exceeded by about 10%," said Kate Delhagen, an analyst at Forrester.

Boston Consulting Group estimated that Web-based sales topped \$4 billion from October through December. "It's probably higher than a lot

wood City, Calif., said average online holiday spending rose from \$216 in 1997 to \$629 in 1998, according to a study of more than 1,000 Internet users.

Seasonal Glitches

There were some glitches during the season. Barnesandnoble.com had a one-day slowdown in processing transactions. 800.Com Inc. servers were overwhelmed by a special offer (three CDs or movies for \$1) and some shoppers

Vendors in Real-Time Rush Over Java Extensions

HP-led faction seeks to buck Sun and send alternate proposal to standards group

BY CAROL SLIWA

Anyone worried about Java splintering in the embedded device arena should keep an eye on a key vote and series of meetings this week.

The Hewlett-Packard Co.-led group that's developing a real-time extension for Java will learn if its standards effort can move ahead through the National Committee for Information Technology Standards (NCITS), which shepherded C, C++, Fortran and Cobol to become standards.

Device makers and software developers see a real-time extension to Java as critical for

the programming language to work in embedded devices such as printers, cell phones and medical monitors.

Into the Fold

Meanwhile, Java's creator, Sun Microsystems Inc. — which is also developing a real-time extension through its own process — will try to stop the HP-led splinter movement and bring wayward vendors into its fold during this week's real-time Java meetings in San Diego.

So far, the HP-led group's real-time proposal has a 10-3 NCITS vote in its favor, with

five abstentions and one company indicating no choice.

The negative votes from Sun, IBM and Sybase Inc. kicked in a 10-day reconsideration period.

That 10-day reconsideration ends Thursday. Anyone can change their votes — and even a one-vote flip would shoot down HP's real-time proposal, because a majority of the 19 voting members must poll in the affirmative.

If the vote goes through, users face the danger of having two versions of Java for embedded devices.

IBM complained that it will be "confusing and ultimately harmful" to have multiple development efforts. Sybase noted Sun's concerns that the HP-led group could infringe

on Sun's intellectual property rights.

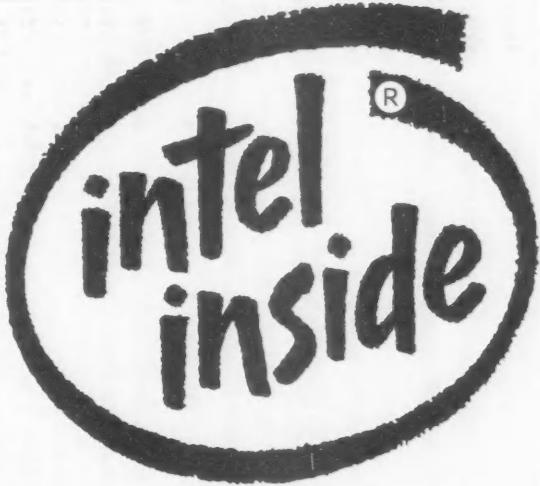
Doing real-time extensions likely will require some modifications to the Java language, according to Sun Vice President George Paolini. But several other companies expressed confusion over that claim because they don't think modifications would be needed.

Sun this week will try to clarify that position and educate the group about its new licensing and development processes. It's even sending Java's inventor, James Gosling, and hosting a dinner for participants. ▀

MOREONLINE

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The Computer Inside.™

Users Applaud Microsoft Y2K Awakening

Free tools, plug-ins and seminars among millennium-bug blitz items from Redmond

BY DAVID ORENSTEIN

Microsoft Corp. has finally gotten around to blitzing the year 2000 problem with a series of free tools and seminars and is reinforcing the effort with its sales channel partners — reaping much praise in the process.

S. Craig Mason, CIO at Key Family of Companies, an Indianapolis-based group of bene-

fits-management firms, said the tools and seminars will be helpful. "I think it's spectacular that they're doing it," he said. "I applaud them — especially for the [free] price."

Best Foot Forward

"They're trying to put forward a good program of help for their customers," said Tom Oleson, an analyst at Interna-

tional Data Corp., a sister company to Computerworld in Framingham, Mass.

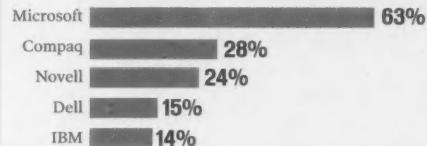
Norbert Kriebel, an analyst at Giga Information Group in Santa Clara, Calif., said Microsoft responded honestly and swiftly to all problems recently discovered in Windows 98.

His analysis of the problems, which Microsoft documents at www.microsoft.com/windows98/highlights/Win98Y2K.asp, was that they're at worst an annoyance for most enterprises.

The blitz Microsoft an-

Microsoft Is Key

Which hardware, software and networking vendors are most critical to your company's success with its Y2K desktop?



Base: Survey of 102 IT managers at companies with 100 or more employees; multiple responses allowed

SOURCE: COMPUTERWORLD INFORMATION MANAGEMENT GROUP FRAMINGHAM, MASS.

nounced on Jan. 7 includes the following:

■ Three plug-ins for Excel 97 that find and convert two-digit

years, change user input to four-digit years and bridge the different century windows in different versions of Excel.

■ Microsoft Y2K Product Analyzer, which finds all Microsoft executable files on a PC's hard drive and tells users what is compliant and where to go on the Web for needed patches.

■ Quarterly TechNet briefings on approaching the year 2000 problem and "Blueprint" seminars for enterprise customers.

■ A biweekly year 2000-specific Listserv.

■ Improved queries at the Web site.

None of the tools is available on the Macintosh platform.

Charging For One

Microsoft will charge an undetermined price for only one of its new tools: a new version (2.0) of Systems Management Server that includes a product-compliance database.

When Rocky Hill, Conn.-based Ames Department Stores Inc. has needed Microsoft's help, the software company has been there.

"They've been fairly reliable in terms of communicating [the availability] of new patches," said Paul Lanham, Ames CIO. ▀

DAILY EVENTS FAIR PLAY IN MICROSOFT TRIAL

News reports, hallway banter finding their way into courtroom

BY PATRICK THIBODEAU
WASHINGTON

THE MICROSOFT Corp. antitrust case is built on more than an examination of reports and E-mails generated months or years ago.

In this trial, the daily newspaper and even casual conversation in the court hallways

have become instant evidence. In computer speak, the trial is happening in real time.

Judge Thomas Penfield Jackson last week gave the most striking example of that phenomenon. In some ways, he is no different from the typical courtroom spectator. He laughs out loud when the testimony is amusing; he yawns and rubs his eyes when bored.

Economist to Lead Off for Defense

Microsoft Corp. will begin its case this week the same way the government ended its last week: with an economist. Richard Schmalensee, interim dean at MIT's Sloan School of Management, is expected to rebut the government's 12th and final witness, Franklin Fisher, also an MIT economist and a former student of Schmalensee. He argued in court last week that Microsoft has monopoly power and has acted anticompetitively. Before it begins its case, Microsoft is expected to ask Judge Thomas Penfield Jackson to dismiss the suit, claiming that the government has shown no violations of the law.

Elsewhere, a federal judge shot down a request by Bristol Technology Inc. to force Microsoft to give it the code for Windows

2000 — formerly Windows NT 5. Bristol, a tools vendor in Danbury, Conn., sued Microsoft in August for alleged antitrust violations in cutting its access to the code. A trial is slated for June 1, just a week before Microsoft faces off with Linux vendor Caldera Inc. in federal court in Utah in another antitrust suit. And Sun Microsystems Inc. and Microsoft are headed back to court this week to argue whether Microsoft should get up to four extra months to make its Java products comply with Sun's specifications.

Microsoft asked for the extra time in part because it said distributors wouldn't be able to offer the revamped products to users in time to comply with the judge's mid-February deadline. — Patrick Thibodeau and Kim S. Nash

He also reads the newspaper in the morning.

The judge's reading habits worked to the advantage of Franklin Fisher last Wednesday. The government economist was testifying that the pending \$3.4 billion merger between America Online Inc. and Netscape Communications Corp. isn't a direct threat to Microsoft dominance.

During Microsoft's cross-examination, Jackson chimed in, citing an interview in *The Washington Post* with AOL CEO Steve Case published that morning. AOL's chief said he had no intention of competing against the Windows operating system.

Turning to Fisher, Jackson asked, "Is this consistent with your understanding of what the impact of this consortium will be in developing viable competition?" Fisher said it was.

Jackson was so interested in what Case had said that he asked Microsoft and govern-

ment defense attorneys whether they planned to call him as a witness. Outside of court, David Boies, the lead government attorney, said Case might make a "useful" rebuttal witness. Microsoft officials said they had no plans to call Case. Even words spoken in a court hallway are quickly becoming part of the record.

During a break last week, Intuit Inc. CEO and government witness William Harris was approached by William Poole, Microsoft's senior director for business development. When Harris returned to the witness stand, Boies asked him about the conversation. Harris said Poole was just "attempting to be helpful."

"I'm sure he was," Boies said. "But I'd like to know what he said." Harris said Poole told him that Microsoft planned to make it easier to change the default browser page on Internet Explorer 5. "In that conversation, did Mr. Poole tell you what Microsoft's plans would be if it were to prevail in this litigation?"

"No," Harris said quietly. ▀

Corrections

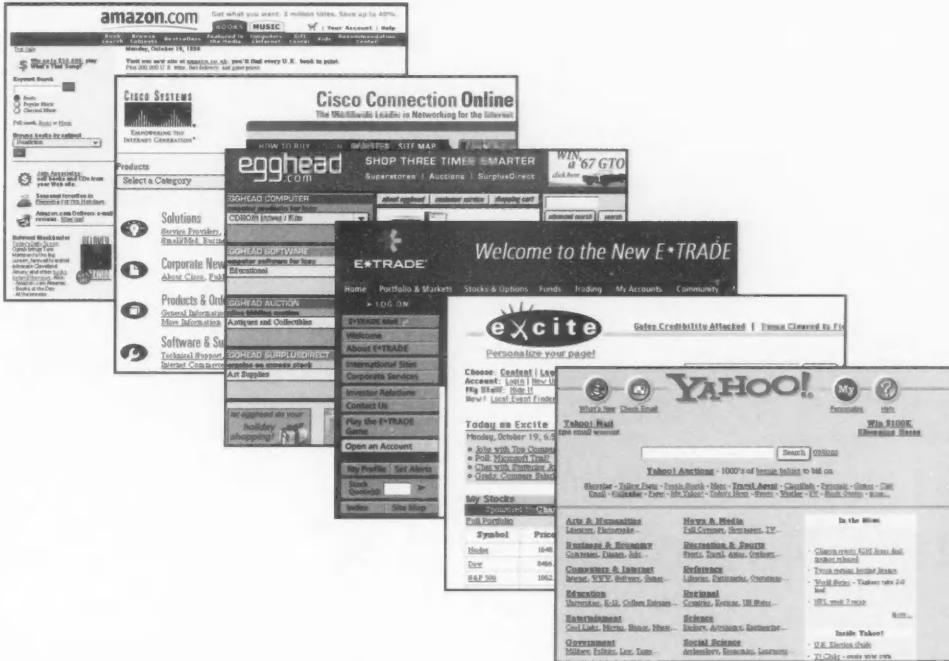
A Dec. 21 Software section story ("Eyeing the competition") misspelled the name of J. D. Edwards & Co. Chairman C. Edward McVane.

A Nov. 9 alt.cw story about the Countdown 2000 baseball cap shouldn't have said that it stops working after Jan. 1, 2000. The user can reset the hat's clock.

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BRIEFS**Wal-Mart Seeks Change of Venue**

Retailing giant Wal-Mart Stores Inc. in Bentonville, Ark., is taking its lawsuit against Amazon.com Inc. to the online bookseller's home state of Washington following an Arkansas court's ruling last week that it has no jurisdiction over Amazon.com.

Wal-Mart is suing Amazon.com and its CIO, along with Drugstore.com and investment house Kleiner Perkins.

The complaint alleges that the defendants stole trade secrets in the form of Wal-Mart's data warehousing and merchandising systems.

Platinum Software Cuts 15% in Merger

Platinum Software Corp., a developer of business applications for midsize users, last week completed a 15% reduction in the combined workforces of its own operations and San Diego-based DataWorks Corp., after closing on an \$18 million purchase of the manufacturing software vendor in late December.

That leaves Irvine, Calif.-based Platinum Software with about 1,700 workers.

HMO Inks \$45M IT Outsourcing Pact

Boston-based Harvard Pilgrim Health Care has outsourced all desktop and network support to Vanstar Corp. in a deal worth \$45 million.

Vanstar, based in Atlanta, also will provide other IT services, including the design and implementation of Lotus Notes-based applications for the health maintenance organization's 9,000 users.

MetLife Outsources PC, Net Services

MetLife Corp. in New York has outsourced desktop and network support services to Entex Information Services Inc. in Rye Brook, N.Y. Under the three-year, multimillion-dollar contract, Entex will provide help desk services and hardware and software installation for MetLife's 28,000 users.

SEC SCRUTINIZING R&D WRITE-OFFS CLOSELY**Network Associates confirms look at how it handled expenses in prior mergers**

BY KIM S. NASH

SOFTWARE AND hardware companies with the urge to merge will now have to be extra careful about how they write off research and development costs.

Security vendor Network Associates Inc. disclosed last week that the Securities and Exchange Commission is scrutinizing how the vendor handled \$219 million in R&D expenses during two acquisitions last year.

If the SEC finds that Network Associates didn't follow properly the so-called in-process R&D accounting rules, the vendor could have to revise financial statements. The SEC and Network Associates said last week that they didn't know how far back any restatements might reach.

But any company that has recently merged, or plans to, may

also hear from the SEC, a spokesman for the Washington agency said.

The accounting rule isn't new. But it's getting new attention from SEC auditors, who said in a September letter to a key accounting regulatory group that they're concerned that in-process R&D write-offs "have increased dramatically both in magnitude and in frequency."

Sticklers for Rules

"In some cases, [acquiring companies] might err on the side of generosity when they come up with things they want to write off," the SEC spokesman said. The SEC is trying "to make sure companies [are] following the rules," he said, as more technology firms merge.

When Company A acquires Company B, any R&D projects at Company B must be valued so that the whole acquisition

deal is priced fairly. The value of Company B's in-process research, which is work that hasn't yet resulted in a product, is typically written-off by Company A at tax time.

The rule — and new scrutiny — applies to all companies, not just technology firms. But computer companies often use the write-off.

Network Associates "did the write-offs in accordance with the standards at the time," said Zach Nelson, a general manager at the Santa Clara, Calif.-based company. "We'll do whatever the new rules require," Nelson added.

Therein lies part of the industry's problem with the SEC. The agency says the rules aren't new, but computer com-

panies said the agency is trying to enforce them in new ways.

The Software & Information Industry Association (SIIA), a trade group formerly known as the Software Publishers Association, maintains that the SEC is springing newly vigorous enforcement of the rules without warning.

Also, the SEC has said its new enforcement will apply retroactively — that is, to mergers that have already been completed.

But doing so "could require that many firms restate their earnings, erode the credibility of the firms and their auditors and [open] potential exposure to shareholder suits," the SIIA said in a letter to the SEC last week. ▀

Y2K Bug Hits Med Devices**FDA issues warning of possible failures**

BY BARB COLE-GOMOLSKI

Health care providers are accusing medical device makers of leaving them in a potential lurch come year 2000 by failing to give them sufficient warning that their equipment could fail to function.

The U.S. Food and Drug Administration issued a warning in the last days of 1998 that more than a dozen medical devices might not be able to accommodate the transition from Dec. 31, 1998, to Jan. 1, 1999. The devices include monitors, defibrillators and electrocardiogram recorders.

Some manufacturers are ominously quiet.

"We've got political posturing going on here," said Cassandra Junker, co-founder of Rx2000 Solutions Institute,

a Minneapolis-based organization that acts as a clearinghouse for year 2000 information on medical devices and software. Messages from Rx2000 members citing date problems with the medical de-

vices that were published on the organization's Web site prompted the FDA warning (see brief, page 44).

Junker said some device manufacturers had been very frank about the problem, warning customers months ago. Others weren't.

Long-term Effect

Industry observers noted that the problem doesn't put patients at risk, because it doesn't interfere with the operation of the equipment. However, it could cause problems down the road. "Going forward, a lot of companies are looking to integrate medical devices with an electronic patient record," said Chris Pavlik, an analyst at Aberdeen Group Inc., a research firm in Boston. "If the dates from these devices are incorrect, that could cause problems."

According to the FDA, some manufacturers — including Hewlett-Packard Co. and Invivo Corp. — verified the date problem. The agency is still investigating whether other manufacturers' products have the problem and whether or not the makers will offer a fix. ▀

Oracle Confirms 8i Delay**Code is finished; needs integration testing**

BY STEWART DECK

Oracle Corp. last week confirmed that its forthcoming Oracle8i database will be delayed at least another two months.

When Oracle began talking about the new release last fall, it said the Internet-oriented database likely would be available by the end of last year. Now company officials say it won't be available until at least late next month or early March.

"All of the code is finished,"

said Oracle spokeswoman Paige O'Neill. Oracle's developers are testing the final integration of Oracle8i with Oracle Application Server, Oracle Applications and the Java development tool JDeveloper 2.0,

O'Neill explained.

"Like almost every software company, Oracle's production schedule has slipped a little. At this point it isn't that big a deal," said Mike Sun, an analyst at Giga Information Group in Norwalk, Conn.

"By announcing 8i as early as they did, Oracle was trying to make a pre-emptive strike and take some wind out of Microsoft's sails" before Microsoft Corp.'s SQL Server 7.0 database was released, Sun added.

Oracle won't include in the first release its much-demonstrated Internet File System (IFS) for storing applications, Web pages and multimedia data, the company said. IFS will be available in June. ▀

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Network Performance Monitoring Tool Casts a Wide Net

BY BOB WALLACE

Help is on the way for network managers seeking tools to bet-

ter monitor the performance of their networks and the applications that run on them.

Ganymede Software Inc. last week said that this summer it will roll out Pegasus Applica-

tion Monitor, software that examines the performance of custom and packaged applications

over corporate data networks.

When the tool is used with Ganymede's Pegasus Network Monitor, managers can track application traffic loads as they travel from clients, across networks and to servers. When response-time thresholds are exceeded, managers are alerted before end users notice problems. The monitor also helps spot and analyze trends.

"Ganymede is shooting high by addressing the broader need in [IT] organizations, which is to monitor everything that contributes to application performance," said Patrick Dryden, an analyst at Giga In-



Energizer™ PME for R/3 and OptiTrak Lit Up The Landscape. Now, Here Are Two More Reasons To Shine.

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OptiGrowth use standard ABAP programming features and R/3 data collection routines. They reside within R/3 and run as an integrated application, which means installation is simple, the transactions are easy and familiar use, and overhead is less than 1%. They work on all platforms that support R/3 and are designed for

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| Pegasus Network Monitor 1.2 | \$7,500* |
| Chariot 3.1 | \$14,000* |

*Base price

SOURCE: GANYMEDE SOFTWARE INC., MORRISVILLE, N.C.

formation Group, a consultancy based in Cambridge, Mass.

Dryden said some network management vendors now offer that capability, but it comes "as one aspect of large and complex and difficult-to-implement software suites."

Ganymede customers expressed interest in its plans.

"We've been able to test the pipes for some time, but with the monitor, we'll get information on server performance, which means we stand a much better chance of determining whether the network or the server is the problem," said Dennis Butcher, a network consultant at Atlantic Richfield Co. in Los Angeles.

"It's important for an organization our size to know as much about application flow as possible to avoid problems," said Ron O'Meara, manager of performance engineering at NationsBank in Richmond, Va. The bank operates a 100,000-node network.

For managers more focused on network performance, Ganymede last week announced Application Scanner, which automatically creates a script to mimic custom applications. ▀

Q: What Comes First? Development or Integration?

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HYUNDAI MOVING ITS SPARE PARTS CLOSER TO ITS DEALERS

Automaker decentralizes supply chain to offer same-day delivery at no charge

BY BOB WALLACE

HYUNDAI Motor America last week detailed an innovative supply-chain project to be launched Feb. 1 that will boost customer service by giving the bulk of its dealers free, same-day delivery of parts to speed vehicle repairs.

The Fountain Valley, Calif.-based automaker will create mini parts warehouses at its 50 largest dealerships that will deliver parts to smaller Hyundai dealers. That will largely replace ordering parts from Hyundai's three far-flung parts centers in California, Chicago and New Jersey.

Most of Hyundai's 470 dealers are small, usually doubled or tripled with other automakers' franchises, and can't afford or don't have room to stock

what they need from Hyundai's array of 29,000 parts.

The project moves parts inventory closer to customers, said George Kurth, national parts supply manager at Hyundai. "We're selecting one or more large dealerships in each major metropolitan area, stocking them with a large cross-section of high-volume parts and paying them a fee for each part they sell," he said.

On the information technology front, a Hyundai programmer and an analyst needed \$300,000 and six months to create the IBM mainframe-based order-entry, processing and -status applications needed to bring the program to life. The process (see chart) requires new hardware and uses dial-up links from the IBM Global Network.

Industry experts said they

hadn't heard of automakers with programs similar to Hyundai's.

"Approaches [typically] include building regional parts warehouses and shipping smaller parts overnight," said Tom Webb, chief economist at the National Automobile Dealers Association, a McLean, Va.-based group with 19,000 members. Hyundai's program "looks like a different experience in [parts] distribution" that should entice small dealers because it's free, he said.

Hyundai's goal is to deliver

parts ordered before noon by 3 p.m. the same day, Kurth said.

Hyundai now offers dealers emergency orders that are shipped overnight and carry a 15% handling charge.

The automaker also offers two-day parts delivery and weekly ordering.

Getting parts faster — minus the fee — is a big incentive, said Ed Newman, president of Newman Ford-Hyundai in Salem, N.H.

"It'll help us get parts faster and serve our customers faster," Newman said. ▀

JUST THE FACTS

Hyundai's Parts Delivery

- Dealer places order via PC by noon
- IBM mainframe directs order to closest supply center
- Center fills orders and delivers parts the same day
- Center transmits parts inventory nightly to mainframe
- Centers are credited for delivered parts and paid a handling charge

SOURCE: HYUNDAI MOTOR AMERICA, FOUNTAIN VALLEY, CALIF.

Intel, Win NT Servers Poised for Breakout

BY APRIL JACOBS

Users and analysts said this year may prove to be a turning point for both Windows NT Server and Intel-based servers, with corporate confidence growing in both platforms' ability to perform higher-end business tasks.

The reason, they said, lies not only with the fact that Intel Corp. is aggressively increasing the power of its processors, but also in growing user comfort with NT Servers' reliability and scalability.

No one argues that NT is ready to compete outright with old faithfuls such as mainframes or Unix, but its days of being completely relegated to the bottom of the barrel are likely over, said Jim Williamson, an analyst at International Data Corp. (IDC), a Framingham, Mass.-based sister company to Computerworld.

Intel outlined plans last week to release eight-way-capable multiprocessor Pentium II Xeon chips by June and began the year with a new 450-MHz, four-way Xeon chip [CW, Jan. 4]. The Pentium II successor, reportedly called Pentium III, is due in March.

Although there's nothing new technically with Microsoft Corp.'s NT 4.0, companies appear to be testing the operating system's ability to perform more than basic file

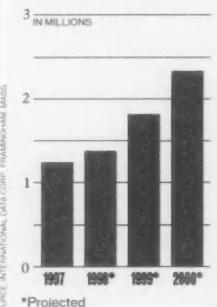
and print tasks, opening the door to more critical uses such as database access.

NT's growth has been strong: Shipments grew 44% from the third quarter of 1997 to the third quarter of 1998, according to IDC's latest figures.

And Windows NT 4.0 Server license shipments will have

NT Server Growth

Windows NT Server shipments worldwide



a cumulative average growth rate of 22.6% from 1997 to 2002, compared with 11.2% for Unix and 7% for Novell Inc.'s NetWare, IDC predicted.

"As you see more powerful hardware, you will see the potential to break in to enterprise-oriented applications," Williamson said. "The other

Excel Security Breached

Microsoft issues patch, denies harm

BY SHARON GAUDIN

A security hole in Microsoft Corp.'s Excel spreadsheet program has some corporate users worried that their desktops are

open to invisible attacks.

Finjan Inc., a San Jose, Calif.-based security company, said Web surfers who use Excel are open to even not-so-technical hackers, who can burrow into their systems and cull information out of any file or server the user has access to.

Here's how it works: A hacker sets up a Web site with corrupted HTML code in it or invades someone else's Web site and plants the code there. When a user who has Excel installed, but not necessarily running, visits the site, the hacker can enter his system. Using a call function in Excel, the hacker can access, alter, steal or delete files undetected.

John Duncan, product manager for Microsoft Office, said he hasn't been alerted to any Excel security breaches. Microsoft offers a patch for Office 97 that disables the problematic function in Excel. ▀

Guarding Excel

How to protect yourself from the security hole:

- Install Microsoft's patch if you don't mind losing Excel's call function
- Update browsers and set security features to a high level
- Products such as Finjan's SurfInGate can block Excel files from moving over the Web

piece is that users feel comfortable with its functionality and reliability to handle enterprise applications."

At First Premier Bank in Sioux Falls, S.D., testing begins in two weeks on NT Server and Microsoft SQL Server to run the bank's credit-card application processing, a key business function. The bank's information technology staff's confidence level in NT and willingness to try it for critical applications have improved dramatically in the past year, said Dave Geiver, a senior technology officer. Even those with a somewhat skeptical technical eye say the NT platform has some clear advantages.

For example, Larry Stouder, director of technical development at Continental Grain Co. in New York, said the new, powerful Intel hardware has made Windows NT more attractive, especially because it's cheaper than Unix systems.

"I'd love to have NT from the desktop to the largest server I have. It would mean one platform to support," Stouder added. But Continental will continue to rely on proven Unix for its business systems for the foreseeable future, he said. ▀

MORE

Server vendors aim on Xeon, roll out four-way servers. See page 76

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BRIEFS

E-Commerce Service

Equifax Inc. in Atlanta last week introduced outsourced electronic-commerce services that will let companies secure applications, manage digital certificates and authenticate consumers by requesting, comparing and analyzing information they supply against data from Equifax and other consumer and business information sources.

Avion Servers

Data General Corp. has expanded its line of midrange and high-end servers with Intel Corp.'s latest 450-MHz Pentium II Xeon chips. The new AV3700 midrange system supports as many as four chips and up to 4G bytes of memory, and the high-end quad-processor AV8700 - two of which can be clustered in a single cabinet - supports up to 8G bytes of memory. Pricing wasn't available.

Free Y2K Tools

Novell Inc. announced last week that it will begin offering several year 2000 tools at its Web site. The free Information Ferret tool will find Novell products on a network and identify their Y2K status. A tool called Check 2000, which must be purchased, helps fix PC problems.

Short Takes

IBM next week will make available alpha code for the new Java 2 platform in its AIX operating system, at www.alphaworks.ibm.com.

MICROSOFT CORP.'s Hotmail last week said it will offer free to its customers virus-detection software from NETWORK ASSOCIATES INC.

LUTUS DEVELOPMENT CORP. last week shipped Sametime 1.0, a client/server package of "instant messaging" software that lets business users chat in real time using typed messages.

STORAGE TECHNOLOGY CORP. and Veritas Software Inc. are expected to announce this week middleware, due midyear, that will enable users to share SCSI-based tape-storage libraries with multiple applications.

VOLVO CARS OF NORTH AMERICA INC. has appointed Mary Magrino Director of Information Technology Services for the automaker's Volvo Information Technology Group in Rockleigh, N.J.

BAAN, JDA SOFTWARE SCRAP RETAIL VENTURE

Both companies stumble into the red; Baan focuses on other industries

BY CRAIG STEDMAN

BAAAN CO. and retail applications developer JDA Software Group Inc. last week called off a joint venture that was announced last summer as a way to propel Baan into the retail market.

The partners had planned to set up a new organization that

would tie together Baan's business applications and JDA's software for retailers. But both vendors have since stumbled into the red and are in the midst of management changes and restructuring programs.

Baan lost \$32 million in the third quarter of last year and laid off 20% of its employees. Phoenix-based JDA last week said it expects a fourth-quarter

loss of up to \$2.5 million, a warning that coincided with the resignation of CEO Brent Lippman.

Neither company would say where the idea of scrapping the joint venture originated. Mark Hamilton, a senior vice president at Baan, said only that the Dutch company is focusing on manufacturing and other key industries now.

JDA said the planned joint venture made some of its customers nervous because of concerns about support and other issues.

Baan and JDA look like "a couple of struggling companies that really just need to get back to the basics," said Steve Bonadio, an analyst at Hurwitz Group Inc. in Framingham, Mass. But retail would be a big market for Baan to miss out on, he added. It's largely untapped now, but rivals such as SAP AG and PeopleSoft Inc. are making big pushes there. ▀

MORE

Baan rival SAP sees fourth-quarter profit dip. See page 29.

Retail Scheduling Systems Get Makeovers

But automation can mean big cultural changes for larger chains

BY CRAIG STEDMAN

Vendors of automated employee-scheduling software for retailers are preparing to deliver new products aimed at increasing the technology's limited number of users.

And enterprise resource planning kingpin SAP AG is about to get in to retail scheduling through an acquisition of one of those vendors — Campbell Software Inc. in Chicago.

As that deal is finalized, Campbell next week plans to announce initial links between its Windows-based StaffWorks scheduling software and SAP's R/3 applications, plus a new corporate-level analysis tool that works with StaffWorks.

Campbell and rivals such as Kronos Inc. in Waltham, Mass., for more than five years have offered systems that can forecast retail-store business and then produce a work schedule.

But the software isn't widely used yet: Campbell has about 75 customers, and Kronos said only a dozen retailers bought a DOS-based system it will replace this week with a Unix and Windows NT application that runs on corporate servers rather than at each store.

Average-size retailers "aren't pushing that hard for this kind of thing," said Steven Cole, an analyst at Forrester Research

Inc. in Cambridge, Mass. And for the larger chains with 100 or more stores that are the main targets for the software, taking scheduling out of the hands of store managers is a big cultural change, he added.

That was the case at Stein Mart Inc., a discount retailer in

Jacksonville, Fla., that has used Kronos' software at its 183 stores since mid-1997.

"We had to say to people who had been doing [manual scheduling] for 20 or 30 years that this computer could do a better job of it for us," said Jackie Charron, an operations

coordinator at Stein Mart.

But schedules can be generated much faster now, she said, and the forecasting tools are helping ensure that Stein Mart stores have "just the right amount of people" at work.

Stein Mart is testing Kronos' new Smart Scheduler software and plans to start upgrading next summer, Charron said. The server-based system looks more user-friendly and adds workforce analysis tools that Stein Mart executives could use, she said. ▀

Users Would Love to Dump Their Messaging Switches

BY ROBERTA FUSARD

Many organizations are unhappy with their message switches and would like to get rid of them, according to a report released last month by Ferris Research Inc., a San Francisco-based messaging consultancy.

And 24% of 195 Fortune 500 firms surveyed think they will succeed in doing that in the next year, the study showed.

But analysts and some users said that might not be so easy. As the E-mail vendors move toward interoperability and standardized directories, the need for switches will decline, said Ferris Research President David Ferris.

The switches translate messages between systems and of-

ten synchronize directories.

They are difficult to use because of the skills needed to manage and support them, Ferris said. But they will endure in the short term because as much as companies strive for a pure messaging environment, they can't avoid mixing and matching E-mail, he said.

A messaging manager at a large retailer that recently underwent a merger and major reorganization of its information systems said his company wouldn't mind getting rid of its messaging switches. But constant upgrades and acquisitions make that impossible, said the manager, who requested anonymity.

There will always be a need

to get to old files from new files, said the manager, whose company uses Wingra Technologies Inc.'s Missive switch to handle a mix of EMC2's TAO, Lotus Development Corp.'s CC:Mail and Notes, Microsoft Corp.'s Exchange and Internet mail systems. "Otherwise nothing can interoperate and you end up with E-mail islands — people printing out their E-mails and faxing them to someone at another site."

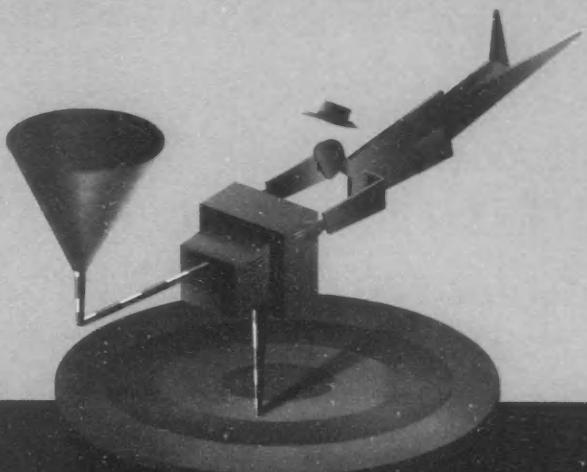
Dave Folger, an analyst at Meta Group Inc. in San Ramon, Calif., said coexistence of messaging systems is the norm for several reasons, including acquisitions and functionality.

When a Notes-based company converts to Exchange or vice versa, the process can take years. And there are always likely to be pockets of users who depend on an application built specially in one system that can't easily be rebuilt in the other, he said. ▀

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DEBUT OF EURO NEARLY FLAWLESS

Minor glitches attributed to human errors

BY THOMAS HOFFMAN

It was human data-entry error — not computers handling international financial transactions — that tripped up last week's long-awaited launch of the euro.

Overall, computers that settle trades for investment banks and brokerages handled the new unified European currency without a hitch, market watchers said.

The only visible problems were delays with a cross-border settlement system created by the European Central Bank called the Target system — and those resulted from human error, heavy volume and bankers adapting to the new system.

"There haven't been any major systemic issues," noted Sarwar Kashmeri, president of Niche Systems Inc., a New York-based financial systems consultant.

Kashmeri said systems conversions at Citigroup Inc., The Chase Manhattan Bank Corp. and J.P. Morgan & Co. "have all gone very smoothly."

Target, short for the Trans-European Automated Real-time Gross Settlement Express Transfer system, consists of 15 national banking systems designed to handle cross-border payments for stocks and other financial transactions.

Prior to the launch of the euro, settlements were handled between each country's central bank.

False Rumors

Rumors last Wednesday that there were problems settling euro-related trades caused the new currency to plunge below its initial reference rate against the U.S. dollar, set on Dec. 31, of \$1.167.

It turned out that some Ger-

man banks were incorrectly inputting settlement data to the Target system, which led to processing delays Wednesday night, said David Gilmore, a partner at Foreign Exchange Analytics, a currency advisory service in Essex, Conn.

"The rumors were false. There were just a few minor [settlement] hitches and most of those were due to human error," Gilmore said.

European Central Bank President Wim Duisenberg said the settlement delays were "teething troubles" as operators at commercial banks and at the central-bank level learned the new system.

Octavio Marenzi, an analyst at financial services and technology consultant Meridien Research Inc. in Newton, Mass., said the euro's introduction bodes well for Wall Street's year 2000 projects. "The systems changes required for the euro were rather complex," he said.



THE ASSOCIATED PRESS

MONEY traders at the London International Financial and Futures Options Exchange entered into brisk bidding at the euro's debut

Worldwide, the reprogramming of information systems for the euro was expected to

cost at least \$150 billion, according to a Gartner Group Inc. projection. ▀

Continued from page 1

U.S. Firms Gird for Privacy Rules

to bode well for E-commerce," said Chet Dalzell, a spokesman for the Direct Marketing Association (DMA) in New York. "It's perception that matters." The DMA is leading efforts to produce the new Web site study in cooperation with the FTC and other organizations, possibly including privacy groups.

Meanwhile, the U.S. Commerce Department is negotiating with European Union officials on how U.S. companies can comply with the new EU Directive on Data Protection.

The directive, which went into effect in October, bars the transfer of data about EU citizens of any of the 15 member nations to any country deemed not to have "adequate" privacy protections — potentially affecting everything from human resources and medical records to travel reservations and online shopping.

"Frankly, most of us don't like what the Europeans are doing, but we understand [their reasons]," said Jim Clawson, CEO of JBC International, a Washington-based consulting firm that has represented a coalition of businesses and professionals involved in overseas trade.

Why worry? Even before the EU directive, Fort Worth, Texas-based Sabre Group Inc. tried to register with Western European countries to ensure that it complied with national privacy laws. The result in Sweden: The Data Inspection Board ruled that travel agents who used the Sabre reservation system needed written consent from all of their customers for their data to be transmitted to Sabre's Tulsa, Okla., data center. The case is under appeal.

Meanwhile, businesses are expressing concern about the

lack of predictability" in Europe, said Barbara Wellbery, counselor to the undersecretary for electronic commerce in Washington.

JUST THE FACTS

Privacy Proposal

■ The Commerce Department proposes allowing consumers to opt out of having personal data stored by a merchant or vendor and used elsewhere

■ The proposal is at www.ita.dcc.gov/econ/menu.htm#Safe

■ An FAQ for U.S. companies will be published next month

U.S. and EU officials are slated to meet again this month to try to negotiate a so-called Safe Harbor proposal — a set of rules that U.S. companies could pledge to adopt that the EU would consider adequate privacy protection. European governments aren't expected to act against U.S. companies while talks continue.

But individual citizens are free to sue under the directive — and members of Privacy In-

ternational in London already have pledged to monitor the activities on and off the Net of two dozen large U.S. firms.

To gauge the state of Internet privacy in the U.S., the FTC surveyed about 1,400 Web sites last March. It concluded that the online industry has "fallen short of what is needed to protect consumers." For example, 97% of financial sites took data from their users, but only 16% stated how that information would be used.

Political and industry officials warned them that new federal regulations were likely if the situation didn't improve.

The DMA said there has been major movement since then, with many more sites posting their privacy policies and joining organizations that provide privacy assurances. The Electronic Privacy Information Center in Washington, though, maintains that there still aren't enough protections in place — and even if sites post policies, there's little assurance those rules are being followed. ▀

Suitors Bid for AirTouch

Several big telecommunications companies bid last week to buy AirTouch Communications Inc. in San Francisco, the world's largest wireless services provider.

Bell Atlantic Corp. in New York and Vodafone Group PLC, Britain's largest mobile phone vendor, confirmed bids, put at between \$43 billion and \$54 billion by analysts.

Analysts expect MCI WorldCom Inc. in Jackson, Miss., to make a bid, although MCI WorldCom officials wouldn't confirm that. Friday, and AirTouch officials noted that MCI WorldCom stated two months ago it wasn't going to buy a wireless provider.

AirTouch, a spin-off from Baby Bell Pacific Telesis Group in 1994, had \$4.9 billion in sales in 1997.

— Matt Hamblen

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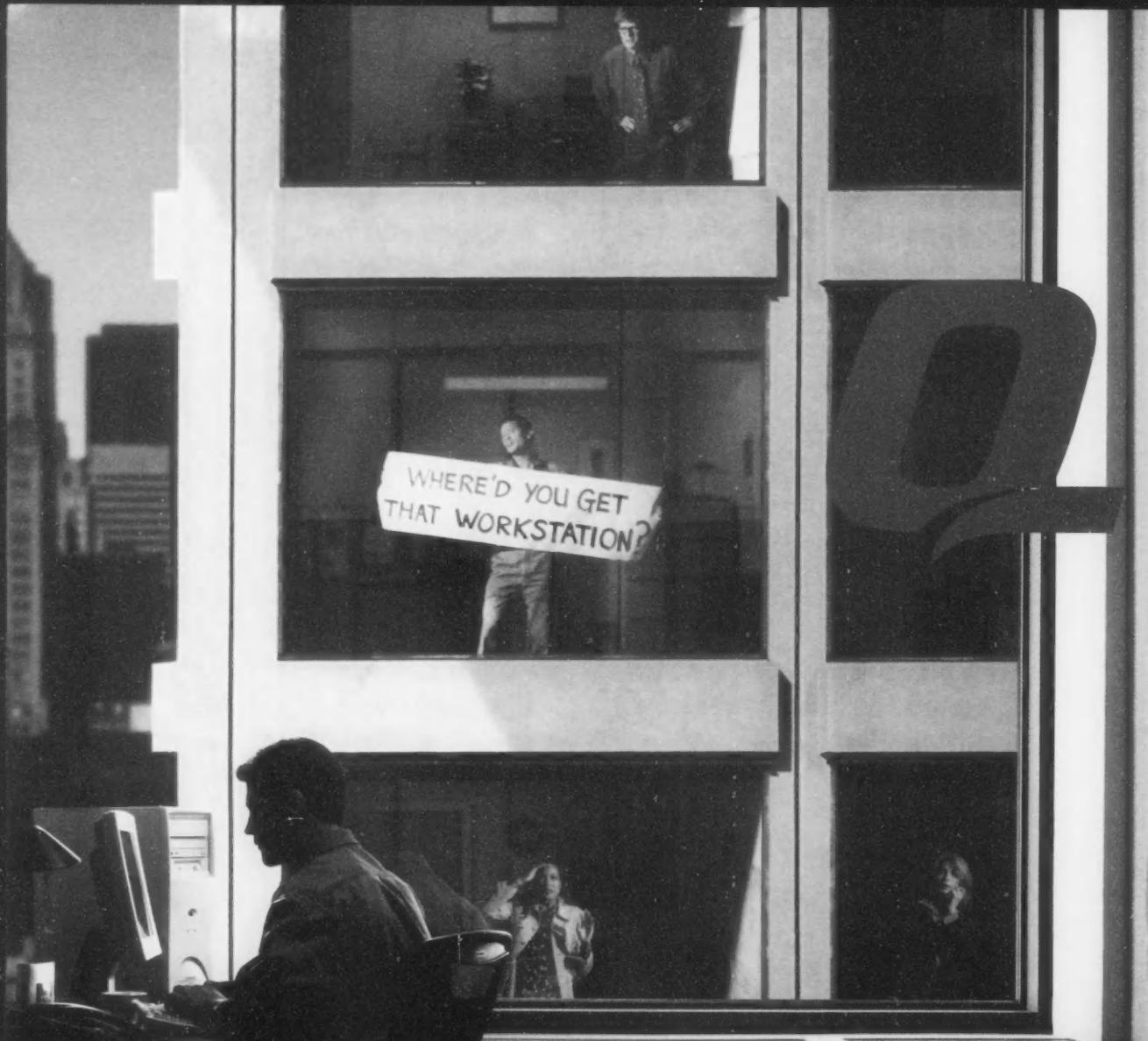
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CONN. AWARDS \$1B TECH DEAL TO EDS

Seven-year outsourcing pact targets state systems consolidation

BY JULIA KING

IN AN unprecedented soup-to-nuts, \$1 billion outsourcing deal, the state of Connecticut chose Electronic Data Systems Corp. to provide and manage virtually all of its information technology.

During the next several weeks, negotiators for the state and the Plano, Texas-based outsourcer will hammer out specifics of the seven-year contract, which is slated to take effect Sept. 1.

State CIO Rock Regan said

greater efficiency and cost savings were key factors in Connecticut's decision to outsource IT.

Regan said EDS already has agreed to take on all of the state's 1,000 IT employees for a minimum of two years.

He will remain as CIO, heading up an internal team of about 90 IT planners and managers to oversee the outsourcing contract.

Agency Liaison

Among other things, the internal group will act as liaison between EDS and the state's 60 agencies.

It also will monitor IT service levels defined in the contract and set the state's overall strategic technology direction.

"The key to success will be managing this relationship," Regan said. "The contract may be comprehensive, but we're certainly not giving EDS and their team carte blanche" over IT, he said [CW, Aug. 10, 1998].

According to Regan, consolidating multiple back-end systems at dozens of state agencies could yield savings in the



CONNECTICUT CIO Rock Regan says managing the relationship with EDS will be key to success

Y2K 'Fixes' Still Show Errors

Sobering Cap Gemini survey forecasts many more applications failures

BY THOMAS HOFFMAN

More than half of America's biggest companies already have experienced some type of year 2000 failure, according to a new survey conducted by Cap Gemini America LLC in New York [CW, Jan. 4].

But what's perhaps more telling are the statistics not revealed in Cap Gemini's quarterly survey — 10% of the "fixed" code that the consultant has reviewed for customers still contains errors.

Translation: Expect firms to experience even more failures into the next millennium.

The high error rates that Cap Gemini and other independent auditors are discovering "will lead companies to have serious problems with the applications they thought were fixed," predicted Jim Woodward, a senior vice president at Cap Gemini in Iselin, N.J.

Similar Findings

The error rate is in line with what other consultants are finding. For example, Capers Jones, the chief scientist at Artemis Management Systems Inc. in Burlington, Mass., esti-

mated that in general, 7% of all software repairs "inject bugs" into existing software, "and the same [percentage] holds true for year 2000."

Another concern out of the Cap Gemini research is that 92% of the 122 companies and government agencies surveyed reported an increase in missed deadlines in their year 2000 projects, which is up from 84% in July.

That doesn't bode well for technologists, who have historically been late in meeting project deadlines.

However, the high percentage of companies that have already experienced year 2000 disruptions isn't too surprising, according to Woodward and Jones, because many software applications contain calculations that look forward into 2000 and beyond.

Together, they will provide desktop and mainframe operations, telecommunications, applications development and systems integration services.

How well Connecticut fares will determine whether and how quickly other states follow its enterprise-wide outsourcing lead. Fewer than 20 states outsource some of their IT services. And no state has gone as far as Connecticut and farmed out everything.

"There are many other states waiting in the wings and watching to see what happens.

There's been a lot of interest in this deal," said Gartner Group Inc. analyst Ellen Zidar.

"The real challenge for the state of Connecticut now is to put adequate management in that will hold EDS and its subcontractors accountable," said Peter Bendor-Samuel, an outsourcing consultant at Everest Group in Dallas. "The trap is believing that because EDS has a contract, they don't need supervision," he said.

EDS already has a significant presence in Connecticut with six offices and nearly 300 employees. Stamford-based Xerox Corp.'s Hartford office, plus several Hartford-based insurance companies, are IT outsourcing customers of EDS. ▀

mates that in general, 7% of all software repairs "inject bugs" into existing software, "and the same [percentage] holds true for year 2000."

For example, 300 taxi drivers in Singapore saw their fare meters go blank on New Year's Day after their new — and supposedly year 2000-compliant — fare meters didn't work. ▀

Cropping Up

Types of year 2000 disruptions already occurring

| | |
|-----|-------------------------------------|
| 85% | Processing disruptions |
| 75% | Financial miscalculations or losses |
| 35% | Logistics/supply chain problems |
| 22% | Customer service problems |

Base: 67 U.S. companies or government agencies; multiple responses allowed
SOURCE: CAP GEMINI AMERICA LLC, NEW YORK

Web Service to Match IT Jobs, Grads

Texas start-up will vet potential hires

BY BARB COLE-GOMOLSKI

A start-up company this week will launch a service to match graduating college students with companies looking for information technology talent.

Austin, Texas-based CollegeHire.com Inc. will pre-screen students in person on college campuses and present those students to its corporate clients as potential hires. The company is a spin-off of Trilogy Software Inc., which has received some attention for its recent success in IT recruiting.

CollegeHire.com's service could help companies that don't have formal campus recruiting programs get access to IT students.

"We don't have the resources to do college recruiting," said Bernadine Wu, a vice president at Jeffries and Co., a brokerage in New York. The firm has 1,000 employees, 100 IT staffers and no in-house recruiters. For Jeffries, the costly process of recruiting on college campuses is out of the question, Wu said. "This service is appealing because [CollegeHire.com] would do the legwork for us," she said.

In exchange for that leg-work, companies pay between 22% and 33% of the hire's first year's salary. This fee is similar to what other industry recruiters charge.

Analysts said they weren't aware of similar offerings. Geoffrey Bock, an analyst at Patricia Seybold Group in Boston, said the service "makes a lot of business sense, particularly for smaller companies."

Some larger companies may be reluctant to let CollegeHire.com represent them in this way, but they shouldn't be, Bock said.

"In the Web era, it's less important for companies to present a corporate face because students can learn about the company by visiting its Web site," he said. ▀

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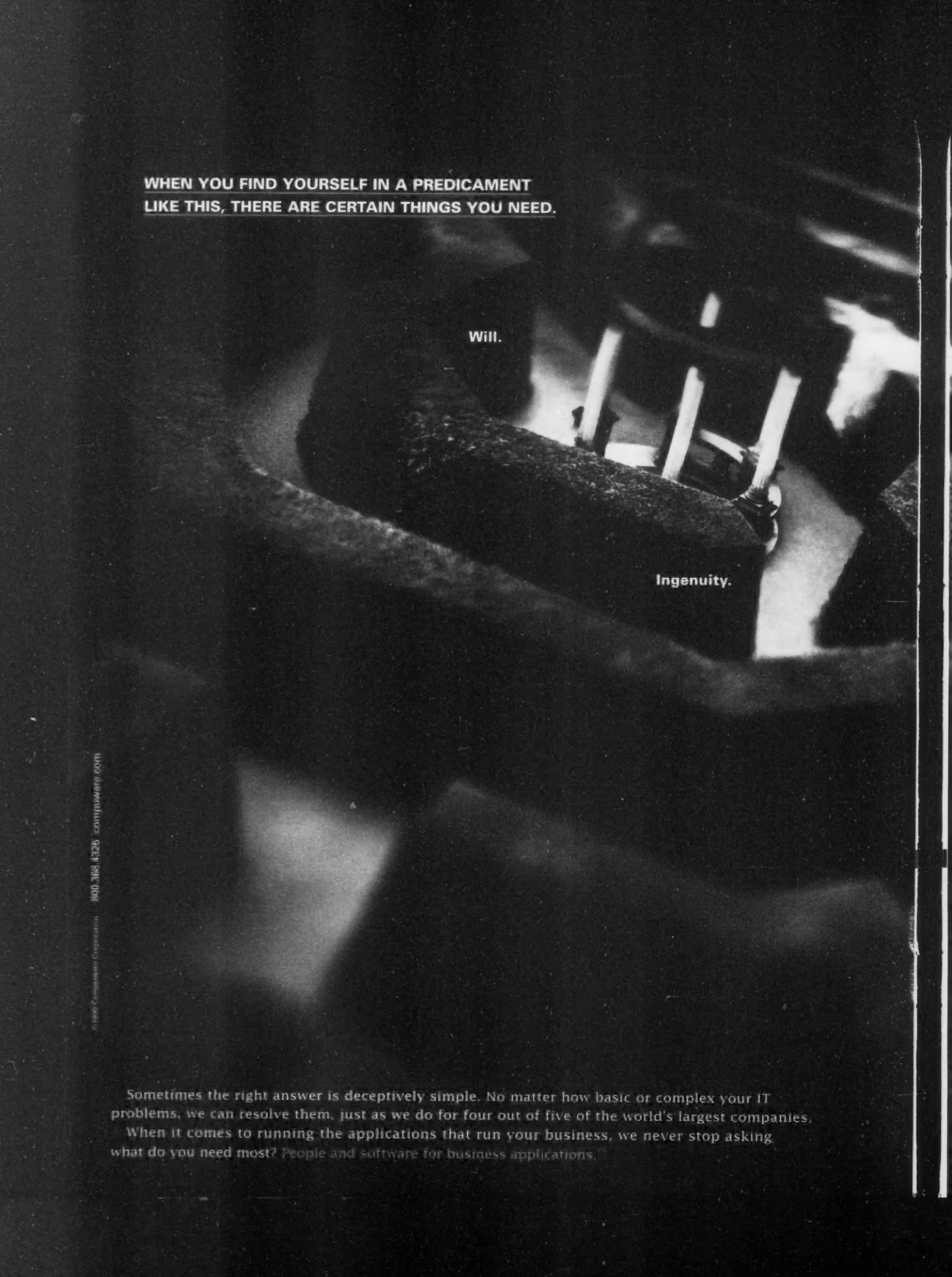
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AOL, JUNO FEND OFF SPAMMERS

Internet providers fed up with alleged fraud take claims to court

BY ROBERTA FUSARO

TWO INTERNET service providers have successfully used the courts to come down hard on spammers — and improve their image in the Internet community at the same time.

Two weeks ago, America Online Inc. in Dulles, Va., filed suit against 21-year-old Michael Persaud of Southern California, claiming that he sent millions of unwanted E-mail messages to its customers. AOL officials said Persaud allegedly sent fraudulent E-mail and forged AOL's domain name in the messages.

AOL, which has 14 million subscribers, is on a roll against spammers. Last month, it won three other lawsuits filed against alleged spammers in Michigan, Kentucky and Tennessee. A company spokesman wouldn't specify the amount of damages awarded. AOL last month also filed charges against nine more alleged spammers in five states.

SPAM FIGHTERS

AOL won the three cases on grounds that the spammers had infringed on its trademark by fraudulently using the "aol.com" domain name in the body and/or header of their junk E-mail. In one case, Virginia's computer fraud law also was applied.

Meanwhile, Juno Online Services LP, with 6.3 million subscribers, said it's close to settling a spam lawsuit it filed in May against an alleged pornography spammer based in New York. That company was charged with trademark infringement and damage to Juno's network and reputation.

Juno's counsel, Richard Buchband, said that since the service provider adopted a "zero-tolerance" approach to unsolicited commercial E-mail in late 1997, it has seen a 35% drop in the volume of complaints regarding unsolicited commercial E-mail.

Spam-fighters applauded the aggressive action taken by the Internet providers.

"Until there is strong legisla-

tion in place [to protect end users], this is what will curb spamming," said Kelly Thompson, a spokeswoman at the Forum for Responsible and Ethical E-mail (www.spamfree.org), an online advocacy group. "It's great to see

AOL and Juno aggressively protect their property."

Juno previously had a reputation for major spam problems, said Ray Everett-Church, co-founder of the Web-based Coalition Against Unsolicited Commercial E-mail (CAUCE) (www.cauce.org). Juno's domain name was being forged on unsolicited commercial E-mail. AOL has been in the same boat, he said.

The Internet providers' legal victories will deter spammers and will help assure customers that they're taking care of the problem, Everett-Church said.

Thompson said more legis-

lation is needed. Also, existing laws against trespassing and fraud should be applied more vigorously in spam cases, she said. "Hijacking an open-relay server is certainly trespassing," she asserted.

CAUCE last week said it's working with House Commerce Committee Chairman Thomas Bliley, R-Va., to bring spam laws to fruition. CAUCE Chairman Scott Hazen Mueller said he's optimistic that Congress will pass "a decent legislative compromise that protects Internet users from cost-shifted advertising" represented by spam. ▀

Are U.S. Agencies Ready for Year 2000?

Critics warn Social Security best of bad lot

BY MATT HAMBLEN

The Social Security Administration may be ready for year 2000, but the Clinton administration's emphasis on that fact prompts Americans to overlook some serious risks, critics said last week.

On Dec. 28, President Clinton said the SSA had solved its year 2000 problem, and Americans would get checks on time after Jan. 1, 2000.

ment of State are going to make it," said analyst Ed Yourdon, chairman of Cutter Consortium Corp. in Arlington, Mass., and a Computerworld columnist.

Yourdon said he's concerned that the SSA might not really be ready because of so many interrelated ties to other government agencies.

The main reason Clinton is sending a positive message is

the syndicated Y2K Today radio show that airs in 120 cities.

U.S. Rep. Stephen Horn (R-Calif.) said he faulted Clinton for focusing on the SSA. Horn's House subcommittee has consistently rated the agency an A on quarterly report cards, while other agencies get failing grades (see chart). The SSA took nearly 10 years to reach its goal, while other agencies got much later starts and may need much more time than is left, Horn said.

John Koskinen, chairman of the President's Council on Year 2000 Conversion, said Clinton and the council have tried to give a balanced view of which agencies and private-sector systems face problems and have had successes. So the SSA announcement wasn't intended to hide any problems, he said. "We should not mislead [the public] in either direction," positively or negatively, Koskinen said.

Council spokesman Jack Gribben said the administration is unveiling a toll-free consumer number, (888) USA-4-Y2K, to answer questions about year 2000 concerns. Koskinen and the Office of Management and Budget have been conducting quarterly assessments and will provide the next one after March 31, when agencies are supposed to be year 2000-ready. ▀

Falling Behind

Grades of federal agencies on their year 2000 progress as of Nov. 13 (latest data available)

| AGENCY | GRADE |
|---|-------|
| Department of Justice | F |
| Department of Energy | F |
| Department of Health and Human Services | F |
| Department of State | F |
| Agency for International Development | F |
| Department of Transportation | D |
| Department of Defense | D |

SOURCE: U.S. REP. STEPHEN HORN, R-CALIF., AND HOUSE SUBCOMMITTEE ON GOVERNMENT MANAGEMENT, INFORMATION AND TECHNOLOGY

However, experts have long expected the SSA to be ready, and critics said Clinton himself needs to focus more on year 2000 compliance in problem areas such as the Department of Defense and the Medicare system, and to push the private sector to fix problems in time.

"The question was never whether SSA was going to make it in time, but rather whether Medicare, the Department of Defense and Depart-

to avoid public panic, analysts reasoned. "Federal officials are very worried about panicking the average person because the whole economy runs on public confidence," Yourdon added.

"Clinton's announcement was a go-back-to-sleep message" intended to quell fears about potential year 2000 problems, such as bank runs or food shortages, said Ed Meagher, a systems integrator in Arlington, Va., and host of

MORE THIS ISSUE

For other stories related to year 2000, see pages 44, 62.

IT Investment in Service Growing

Firms seek stronger bonds with customers

Spending on customer service systems will outpace overall IT spending in the coming year, according to Meta Group Inc. in Stamford, Conn.

Companies are looking to maximize customer retention so they're investing heavily in this area, said Aaron Zornes, a vice president at Meta. The research firm recently polled 171 information technology managers in U.S. companies and found that they plan to boost spending on customer relationship management systems by 23% in the coming year. This category includes traditional call-center management systems and Web-based sys-

tems for managing customer interaction.

The growth is being driven by the desire to deliver customer service via the Web, and to use the Internet to market goods and services to customers, the survey found.

The findings didn't surprise Jim Sterne, president of Target Marketing, a Santa Barbara, Calif., consultancy, and author of *Customer Service on the Internet*. "Customer expectations are rising," Sterne said. "If I am looking for information about your products or my account and I can't get it on your Web site, I'll go to your competitor," he said. —Barb Cole-Gomolski

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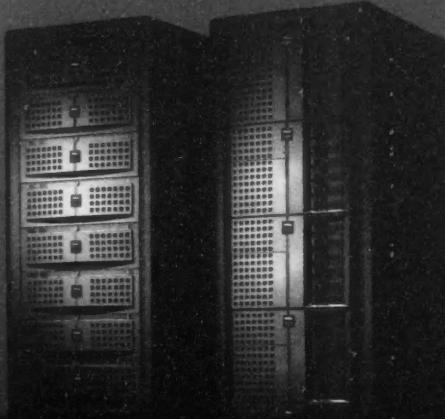
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Web Language That Tags Site Data Gains Industry Support

BY DAVID ORENSTEIN

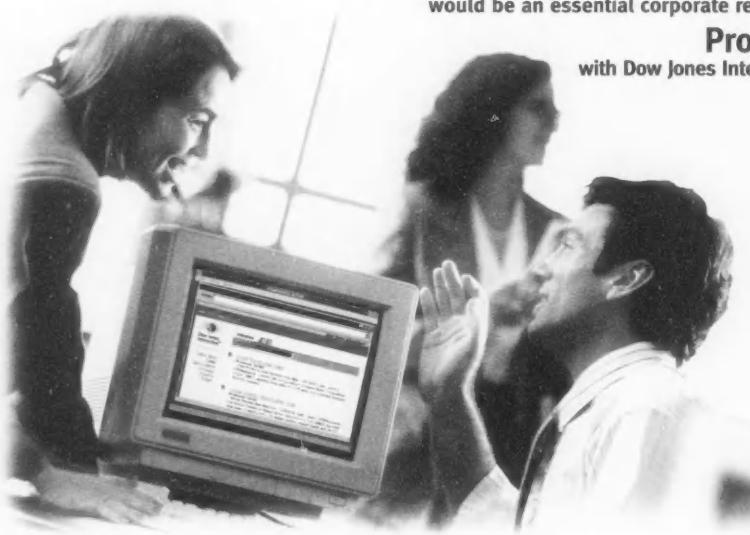
EXTENSIBLE MARKUP Language (XML) was one of the hottest technologies to emerge

in 1998, but 1999 is when it will become a stylish way to publish on the Web.

Extensible Style Language

(XSL), which provides a powerful way to display XML-formatted data, is working its way through the World Wide

Web Consortium's standards process. A proposed recommendation of XSL 1.0 is due by midyear.



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Using XML tags, Web developers can apply contextual labels to data in documents and other nontabular sources. The labels classify the data, making the information searchable, sortable and easier to analyze. For instance, a developer could label data from an inventory list by applying tags such as "brand," "price" and "size."

XSL lets users design a template that specifies how each kind of data should be viewed. Those requirements then are applied to each tag. The user could specify that brands be blue and in large type while prices would be black, right-justified and in small type.

Vendors are lining up to support XSL. Microsoft Corp. said it will support XSL in Internet Explorer 5.0. Last month, Lotus Development Corp. released an experimental XSL processor. And Arbortext Inc., based in Ann Arbor, Mich., has been shipping an XML style-sheet editor for months.

"[XSL] is tremendously powerful," said Rita Knox, an analyst at Gartner Group Inc. in Stamford, Conn. XSL's specific orientation to XML will not only let developers publish XML-tagged data, but also let end users manipulate data views. By contrast, the recent Cascading Style Sheets extension to HTML, which lets users specify presentation of Web content, doesn't allow the data to be manipulated, removing a key advantage of using XML in the first place.

Big Time-Saver

XSL could be a big timesaver for developers at Dow Jones & Co.'s *Wall Street Journal Interactive Edition*, said Alan Karben, associate director for interactive development. The site is developing an application, using data tagged with XML on the server, to let subscribers view and manage their investment portfolios.

Developers now must write and debug JavaScript routines to display XML-tagged financial data. XSL could simplify the task by letting developers create templates rather than complex scripts.

Knox said developers can program Web sites to use different XSL templates to accommodate users with various access privileges or to fit different devices such as PCs or handhelds. "XSL can also act as a filter," she said. ■

NEWS INDUSTRY

BRIEFS

AT&T Loses Ruling

America Online Inc.'s claim that it has proprietary rights to the phrase "You have mail" suffered a blow when a federal judge rejected AOL's effort to prevent AT&T Corp. from using the phrase for incoming E-mail.

AT&T also sought to use the terms "buddy list" and "IM" (instant message) to promote its new "IM Here" instant messaging service. But Dulles, Va.-based AOL claimed it has trademark rights to all three phrases.

After AOL sought a temporary restraining order against AT&T, a U.S. district court in Virginia ruled Dec. 24 that AT&T made a sufficient case that the terms are likely generic.

Modem Pioneer Hayes Closes

Atlanta-based Hayes Corp. – once the standard-setter for PC modems – said last week it laid off about 250 employees and has "effectively ceased operating." The modem maker filed for bankruptcy court protection on Oct. 9 and hoped to restructure or sell the company. But Hayes' primary lender was unwilling to fund a refinancing or sale and would finance only a liquidation, a company statement said.

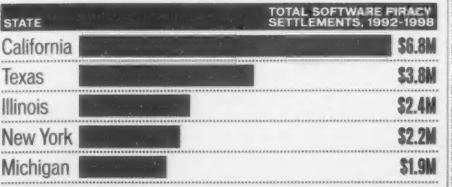
SHORT TAKE

The Department of Justice recently approved the \$4.8 billion merger of AT&T CORP. and TELE-COMMUNICATIONS INC., but the merger still requires action by the Federal Communications Commission.

SNAPSHOT

Piracy Coves

Top five states where companies are most often caught with illegally copied software



SAP HITS SOME FINANCIAL DIPS

Fourth-quarter profits take a tumble as revenue growth forecast moderates

BY CRAIG STEEDMAN

AFTER YEARS of skyrocketing revenue and profit growth, ERP market leader SAP AG is getting a taste of what life is like on the wrong side of the financial tracks.

The German application vendor last week disclosed that its pretax profits for the past three months are expected to drop about 15% from the fourth quarter of 1997. And profit growth for all of 1998 will reach only 15% – barely half of the increase SAP confidently predicted as recently as October (see chart).

Yet SAP isn't in nearly the same straits as Baan Co., which lost \$32 million in last year's third quarter and last week

said it was issuing new stock to an investment firm in return for a \$75 million infusion.

But analysts said a forecast

The culprits include back-office saturation at large companies and the closing of the window for the year 2000 fixes that helped push numerous users to buy ERP applications.

"You talk to any of the ERP vendors and it's pretty tough for them to forecast [sales]

SAP Revenue and Profit

| | REVENUE | PRETAX PROFITS |
|------------|---------|----------------|
| Q4 1998 | \$1.5B | \$423M |
| Q4 1997 | \$1.3B | \$496M |
| TOTAL 1998 | \$5.0B | \$1.1B |
| TOTAL 1997 | \$3.6B | \$993M |

Note: Figures in U.S. dollars; 1998 figures are preliminary

by SAP that its revenue growth will moderate from about 40% in 1998 to 25% or less this year is further evidence that demand for enterprise resource planning (ERP) software is tightening up, at least for now.

right now," said Brent Thill, a financial analyst at Credit Suisse First Boston Corp.'s San Francisco office. "There's just a lot of uncertainty."

SAP, which is scheduled to report its actual 1998 financial

results on Jan. 26, blamed the expected fourth-quarter profit decline on the volatile economies of Japan and Russia. Japanese sales were \$120 million below plan and revised accounting practices in Russia knocked profits down another \$24 million.

But the company also is starting to feel the pinch in the U.S., Thill said. He estimated that fourth-quarter sales growth for SAP America Inc. was 20% to 25%, compared with a 65% increase in the first nine months of 1998.

Like other ERP vendors, SAP is trying to extend its reach with users by tailoring its R/3 software to different industries and by developing new applications that can handle data analysis, supply-chain planning and customer management.

But most of those new products aren't expected to become big sellers overnight.

For example, it will be "another year to 18 months before a company can automate its supply chain from end to end" with SAP's software, said Steven Cole, an analyst at Forrester Research Inc. in Cambridge, Mass. ▀

SGI's New Direction: NT Workstations

CEO says still committed to Unix

This week's launch of Silicon Graphics Inc.'s Windows NT workstation represents a make-or-break move for the beleaguered Mountain View, Calif.-based vendor. The once high-flying maker of costly,

proprietary, Unix-only workstations and servers has been struggling with internal snafus and bruising competition from low-cost Wintel boxes.

Here, CEO Richard E. (Rick) Belluzzo, a former No. 2 at Hewlett-Packard Co., talks with senior editor Jaikumar Vijayan about \$3.1 billion SGI's entry into the Windows workstation market.

CW: Why is this week's launch so important for SGI?

Belluzzo: First of all, from a business perspective ... it really gives us the opportunity to stimulate growth. It reflects the new SGI.

Our products have always delivered performance and innovation, [but] we used to focus on a very narrow market. What we are doing with this launch is taking our technology and making it more mainstream.

CW: Analysts are concerned that



SGI CEO Richard E. Belluzzo

SGI's new Windows NT workstations are still too narrowly targeted at the high-end market.

Belluzzo: I have always believed in focusing ... on picking a segment where you can deliver differentiated value. We picked on not being a "me-too" [vendor].

If you look at HP, Dell and Compaq Windows NT workstations, they're really high-end PCs built on the same boards. They are purely in a

price game with undifferentiated products.

CW: Is it too late for SGI to enter the Windows NT market?

Belluzzo: If we had a choice, we would have gotten into the market earlier, but we certainly don't think it is too late. There is a lot of demand for differentiated [products].

CW: Will the new focus on NT mean a dilution of effort on the Unix side?

Belluzzo: NT will allow us access to a broader market ... [but] we simultaneously remain as committed to the Unix space as in the past.

CW: SGI has had some lengthy product cycles and manufacturing delays in the past two years.

Belluzzo: We have worked on those issues considerably ... and if you look at the operational [side], we have made a lot of progress. We want to have more of a stated rhythm in terms of delivering products. Today, we are all about delivering products in a more timely manner. ▀

PAUL GILLIN

Home improvement

SAN JOSE, CALIF., is home to one of the strangest structures in the world. The Winchester Mystery House consists of 160 rooms built over a 38-year period by a wealthy widow who believed she would die if construction ever stopped. It's an architectural absurdity: Stairs lead nowhere. Doors open on blank walls. There's even a window built in to the floor.

We've all seen buildings that, through frequent additions and renovations, end up looking nothing like their original design. The same thing happens to publications. At *Computerworld*, the basic structure of the newspaper has remained unchanged since the late 1970s. But so many features were added or replaced over the years that it had become a bit of a Mystery House.

So last spring we decided to renovate. We surveyed more than 1,500 subscribers, conducted focus groups and met one-on-one with dozens of CIOs to ask about their information needs. The message was strong: People wanted news about how to use technology in business, and they wanted to find information as quickly as possible.

What you hold in your hands is the result of all that feedback. We updated and simplified *Computerworld*. To answer readers' requests for business and technology news, we streamlined 13 sections into just three: News, Business and Technology.



PAUL GILLIN is editor in chief of *Computerworld*. Contact him at paul_gillin@cw.com

Inside Business, you'll find stories relating to the bottom line: how to gain business benefit through IT, manage people and projects and develop your career. In Technology, you'll get technology trends and advice on buying and using IT products. Leading it all off is the largest weekly News section in the IT industry.

We've also answered the demand for speed by adding indexes to the front of both the Business and Technology sections. We've increased the number of brief items in each section. We've even simplified our list of editorial contacts.

And there are other goodies, too. As we count down to 2000, our Flashback page will look at a different year in the history of computing each week, beginning with 1950. And our new Field Report feature evaluates products based on real-life user experiences.

I hope you like the new *Computerworld*. And whatever your reaction, I hope you'll tell me at the E-mail address above. ▀



DAVID STROM

E-wallets: Not the right solution for E-commerce

IF YOU'RE TRYING to enable electronic commerce on your Web site, one thing you should steer clear of is electronic wallets. Despite numerous and varied technologies, none of them works very well. Most just waste your customers' time and will cause them to send their shopping dollars elsewhere faster than you can say, "World Wide Wait."

In theory, electronic wallets are a good idea. They store shoppers' credit cards and other identifying information electronically, so buyers don't have to fill out the various payment forms.

With a single keystroke, the electronic wallet fills out those forms correctly and saves your customers lots of typing to order your stuff.

Unfortunately, theory and practice differ. Electronic wallets just don't work. Every one I've tried has failed on the first attempt at buying something. That isn't a good track record. In fact, it's one that can send shoppers back to their cars and the local malls.

Some electronic wallets, such as those from start-up Launchpad Technologies (known as Ewallet), Microsoft (an electronic wallet is included with Windows 98) and Citibank's EWallet take the form of software that must be installed on buyers' PCs.

That's a problem if your customers upgrade or switch their browsers or use more than one PC to shop. Others, such as those from DigiCash (which recently filed for Chapter 11 reorganization) or CyberCash, actually encode monetary value on your hard disk.

To use them, you first have to exchange your hard-earned money for the Internet bongo bucks that are the scrip of choice for each wallet. That has the unfortunate side effect of losing all your dough if your disk crashes. Some electronic wallets work only on particular browser versions: Citibank's doesn't support Microsoft Internet Explorer, for example.

Imagine how hard life with physical wallets would be if they acted like electronic wallets. You would have to carry several different kinds of wallets around with you because each store would accept different payment systems. You



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couldn't convert your dollars from one system to another without a great deal of work.

And if you lost your wallet, you would be out of luck. I daresay consumerism would take it on the chin.

Here's my advice. If you have a Web storefront, steer clear of electronic wallets for now. Let your customers pay you as easily and as quickly as possible. Use credit cards and faxed purchase orders, too. If you need inspiration, take a look at what Amazon.com does with its one-click ordering method: It stores customers' account information on its site and sends customers a cookie to keep track of who they are.

It isn't perfect, but it's painless. After all, the easier your site is for customers to buy stuff, the more stuff they'll buy. ▀

DAVID MOSCHELLA

How retailers can make the Web work for them

HAVING JUST witnessed a remarkably strong online Christmas shopping season as well as the astronomical surge in Web retailers' stock prices, you have to wonder: Will Web retailing really be dominated by new companies such as Amazon.com, CDnow and EToys? Or will long-established consumer brands eventually regain control? At stake, of course, is a huge chunk of the nation's businesses, jobs and consumer spending.



DAVID MOSCHELLA is an author, independent consultant and weekly columnist for Computerworld. Contact him at dmoschella@earthlink.net

That megaproblem can be boiled down to a much more answerable one: Is a large physical store presence a precious asset or a serious liability? With the market capitalizations of many Web retailers now rivaling or even exceeding their physical counterparts, many investors clearly believe the latter.

But to me, the current excitement looks like a significant overreaction. There are only three basic types of online retail situations, and at least two of them appear quite well-suited to existing retail brands.

First are those firms that already sell their own goods directly to their customers. That list includes L.L. Bean, Lands' End, Kinko's, Citigroup and Intimate Brands' Victoria's Secret. For those well-known brands, the Internet is a huge net plus. Established companies can enjoy all the

benefits of online retailing, while maintaining tight control over both physical pricing and cyberpricing. They should count their blessings and make sure they don't blow a great new opportunity.

A second class of retailers consists of those stores that mostly sell other companies' goods. Examples include Wal-Mart Stores, Barnes & Noble, Federated Stores' Macy's, MTS Inc.'s Tower Records and Toys R Us. Despite their often sluggish efforts thus far, those companies also should benefit from the growth of the Web. There's no reason that they can't re-create their current store experience online while also enhancing their in-store capabilities. They just need to do that before the pure online players get too strong.

The third class of companies consists of firms that mostly sell through stores, dealers or other intermediaries. Typical examples of these companies include Nike, Mattel, Levi Strauss, the automakers, the drug companies and, of course, Compaq, Hewlett-Packard and other high-tech vendors. That's certainly the most complex situation: Would those great brands be better off shifting away from their resellers and using the Web to sell directly?

Make no mistake: It's almost impossible to do

both. Competing with your resellers typically results in a highly uncivil war, and yet the pressure to sell online is becoming greater every day. What to do?

There's really only one simple path forward. These companies must make sure that their products are sold effectively online, but not by themselves. Compaq, HP and so on should aggressively support and even invest in online PC retailers. They could then treat their physical and Web retailers identically, while realizing the benefits of both channels.

Don't forget that many of the advantages that Dell enjoys today don't stem from selling direct; they come from selling online. It's a crucial distinction. Equally important, the added value of PC retailers is nearing its ebb, but it will likely rise again once digital entertainment systems, in-house networks, and voice/data integration technology begin to take hold.

The Web is a great new retail channel, like malls and superstores in the past. Although there are no insurmountable reasons that most of today's retail leaders can't make a successful transition, history suggests that many won't. However, let's be clear: For those that fail, the problem will lie with management ineffectiveness, not technological destiny. ▀

READERS' LETTERS

Shoemaker says SAP is a good fit

THE ARTICLE "Shoemakers wrestle with SAP projects" [CW, Dec. 14] took my words out of context. What I had said was that we, Bruno Magli, are not upset by the five-month delay from our SAP rollout.

We fully expected a delay to be part of designing new software and being part of the consortium of companies that's developing the functionality of SAP's apparel and footwear solution (AFS).

As I had told your reporter, the delay has caused us no pain and is still within our expected time line. The article implies that this has caused us grief and suffering. Not so! Many of our customers credit SAP's reputation as being one of the factors that gave our customers a very high comfort level

that electronic data interchange and year 2000 compliance will be correctly and professionally addressed.

The quotation "We're not out of the woods yet," Cadmus said. "We're going very gingerly right now, but we're still alive," implies that I had said we had gone beyond the halfway point and that we are committed to AFS. I told your reporter that our staff had shown great support and enthusiasm. You are doing all the participants in this project a disservice by painting the situation in negative hues.

Henry Cadmus
Vice president of operations
Bruno Magli America Inc.
Carlstadt, N.J.

Liebmann piece was nicely Jerry-rigged

IJUST WANTED to say I enjoyed Lenny Liebmann's article ["Treat users as customers? Now there's a bad idea," CW,

Dec. 21]. Especially the "mythological" SLA!

I hope Liebmann has seen the movie *Jerry Maguire*: His article could be interpreted as his "mission statement."

I look forward to more articles from contributors like Liebmann, who aren't inclined to just get in line with the latest management "buzz concept."

Richard D. Patton
Dual Inc.
Houston
richard.patton@lmco.com

Trespassing by any other name . . .

I'D LIKE TO give my two cents on Tracey Claybrooke's comments in the story "Those flippin' recruiters!" in the Nov. 23, 1998, issue of *Computerworld*.

Oh, how I loved Claybrooke's comments concerning "flipping" Web pages in order to uncover recruiting gold! Put her up alongside the

long list of hackers who have used the excuse "It was open so I walked in" to rationalize their unethical behavior. I'll make it easy for you, Tracey. If I come to your house, turn the door knobs on all your exterior doors, find one that you've forgotten to lock, walk in, unplug your TV set, and walk out with it, that's not proper behavior. That's illegal behavior. There are terms that more accurately describe that action than "flipping" and "stealing."

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COMPUTERWORLD welcomes comments from its readers.

Letters shouldn't exceed 200 words and should be addressed to Maryfran Johnson, Executive Editor, Computerworld, PO Box 9171, 500 Old Connecticut Path, Framingham, Mass. 01701. Fax number: (508) 875-8931; Internet: letters@cw.com. Please include an address and phone number for immediate verification.

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NEWS OPINION

HELEN PUKSZTA

Don't split IT strategy from business strategy

TO EXPLOIT IT for maximum business benefit, it can't be relegated to the passive role of supplying technological responses to pre-established business goals. IT should also drive those goals. But drumming up more attention and resources for strategic IT planning as we know it won't transform IT into an active business participant. Enclosing IT strategy within strategic business processes will.

The biggest obstacle to IT participation in business strategy is treating the IT component as a discrete function. If your company holds the belief that the scope of IT responsibility is to follow up with a set of technology approaches to match business objectives, you will be tempted to set up IT strategy as a distinct process.

In fact, you may feel that doing so will elevate the IT function to a more visible level. But how will you spot IT-inspired business opportunities if you're not involved until after the strategy has been established? Clearly, making IT strategy stand on its own reduces the participation of IT to an afterthought or an appendage to strategic planning.

The solution is to do away with IT strategy as a separate function and to subsume it completely within your company's strategic business processes. In short, to gain more prominence and exert more influence, IT strategy has to lose its distinctness.

Don't get me wrong. I do think that parts of IT planning can and should occur after the business direction has been charted. But these are the parts that have to do with the supply of IT solutions — the *how* questions. What has to be interwoven with business strategies are the pieces that deal with the potential of IT to define new business directions and new applications — the *what* questions. Too often, I've seen IT managers escape into the comfort of proposing data architectures and networking strategies and neglect to take charge in searching for new business possibilities.

Keep in mind, though, that integrating IT with strategic business planning won't be sufficient. Insights feed strategic thinking, not structured



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processes. Following a formulaic planning process puts a limit on the frequency and intensity of an IT group's participation. The only way to overcome that is to make IT strategy a continuous process that is completely and seamlessly integrated with business operations at all organizational levels.

The goal here is to permeate your business community with IT insight and the IT organization with business awareness. That requires physical proximity of both groups and frequent — ideally, daily — interaction.

IT presence is required not only in leadership circles, but also in every business unit and department and on every project of any significance. After all, strategies devoid of IT consideration could neglect both technological threats and opportunities. Encourage your IT representatives to share IT knowledge with their business counterparts and to approach business challenges with initiative and creativity.

We've all heard exalted speeches about business-IT alignment. Such alignment will likely remain elusive until your business users start to consider strategic use of IT on a regular basis. When IT thinking becomes a habitual and spontaneous element of management behavior, you'll know you've found the IT Holy Grail — a bidirectional and self-sustaining alignment of business and IT. ▀

DAVID ORENSTEIN

Why Americans won't ever give up their precious PCs

AMERICA IS NOT a collective, collaborative culture. We are rugged individualists, liberal capitalists and voracious consumers. It's entirely natural that the PC became an American institution long before the Internet did.

That reality profoundly bothers some of the most luminous thinkers in the computer industry. Three decades and one month ago, they lecture, Douglas Englebart showed that computers were vastly more than punch-card-driven number crunchers.

With mice at our sides, hyperlinked text on our terminal screens and video linkups at our desks, we could solve whatever problem we put our networked minds to. The ultimate value of computers was their power to bring people together into a massively parallel, highly distributed, problem-



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solving cluster. Or so they hoped at places like the Stanford Research Institute (now SRI International), where Englebart conceived the mouse, and Xerox's Palo Alto Research Center.

But instead of that glorious ideal, they lament, the computer industry focused on developing isolated PCs to run word processors.

I don't lament that the PC developed a highly capable existence of its own before it became tethered to the network, and neither should you. If you value creativity and individuality in your employees, you'll nurture their sense of ownership in their work and their deeply ingrained sense of freedom. Versatile, powerful PCs do that.

To so-called knowledge workers, the PC is an extension of the mind. I want to be connected to a network, but I don't want to depend on it. I don't want line noise and server downtime to stifle me, and I want at least a little privacy. The visionaries who evoke the models of electric power or telephone service as ideal thin-client models are perhaps forgetting that no one uses those services creatively.

I'll make the case for PCs in American terms: I want to drive my own car rather than take the bus.

Sure, there are reasons to take the bus. Mass transit is far better environmentally, reduces traffic, lets you read while you commute and can be cheaper than car ownership. Cars seem gluttonous, but they provide the freedom we want in our lives.

Likewise, networks are vitally important. But in our hearts, we want to be asked, "What's on your PowerBook?" not "What applications are you leasing?" Or, "What's in your folder on the server?" Or worst of all, "I've accessed your folder and read what's in it, so never mind."

A PC, like an automobile, gives you the control and power to accomplish what you need and want to do, and it provides a liberating environment in which to do it.

The teamwork made possible by the Internet has limitless value. Thin clients are cheaper and easier to support. But creativity is born of freedom, and even a bit of excess. (After all, how much marble ends up on a sculptor's floor; how much film on a director's?) Is it wasteful to buy a book when it's free at the library? Perhaps, unless you want to scribble your thoughts in the margins, read at your own pace and refer back to the book in the future when it's convenient to do so.

At its core, the American system encourages independence and individuality. While the U.S. Constitution secures numerous individual freedoms, it doesn't mention political parties. Our president and judiciary are independent of Congress. That's an important contrast to European parliamentary systems, in which every branch and function of government is subordinate to the ruling legislative party. Americans often vote for people, not parties. Our system values personal principles above efficient collaboration.

Individual PCs enable individual expression and thought. They let you join a collective but don't require it. The PC is a model of the American psyche. Don't tread on it. ▀

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BUSINESS

ONLINE MORTGAGES

When you're financing a home, the Web is a good place to shop. The big tasks, such as locking in a rate, still require phone, fax and traditional mail. Yet experts say the online mortgage business will evolve much like stock trading: Big players will fail, and middlemen will scramble for new roles. ▶ 52

DREAM JOB, BIG CHALLENGES

Who wouldn't want to work for Industrial Light & Magic, which does special effects for flicks such as *Star Wars*? The coolness factor is a definite perk, but the top tech job comes with a lot of pressures. The company is growing so fast and has such high technical requirements that it's hard to keep up. Nonetheless, H. B. Siegel is confident he can keep IT on course so that the *Star Wars* prequel will hit movie theaters on time. ▶ 38

TIMING IS EVERYTHING . . .

... when it comes to negotiating a deal on equipment, savvy users say. Vendors that need to make quarterly or yearly sales targets, for example, are more likely to strike deals. ▶ 61

TOP CITIES FOR IT JOBS

Looking for the most fertile IT job markets for 1999? Computerworld ranks the top 10 cities

for IT job availability, skills demand and salary size. ▶ 64

BANKS EYE E-BILL PAYMENT

As bills and payments go online, banks have a particular need to stay current: Cash services are one of their big profit centers. A lack of standards could make that difficult, but some are entering the ring nonetheless. ▶ 41

AMADEUS READY TO ROCK Y2K

On Jan. 1, 2000, it won't matter if the planes can fly if there are no passengers in the seats. Travel companies have to fix their reservations systems now to process bookings for next year. International travel service Amadeus National Marketing Cos. says it's on target and is testing its systems with travel partners. ▶ 44

IT CONTRACTORS STAY IN TOUCH

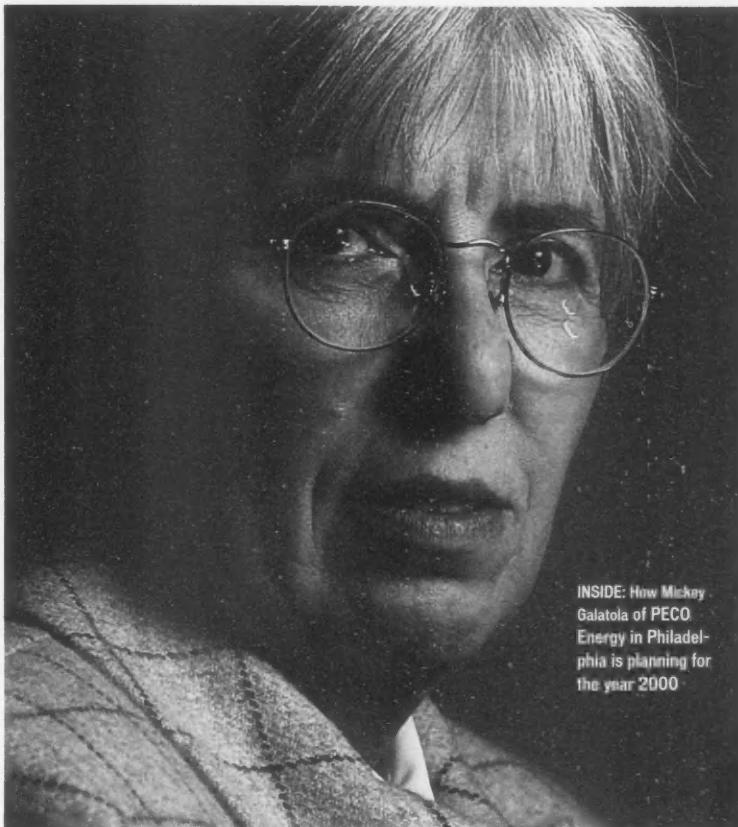
Working as an independent contractor or consultant can be lonely. But you can maintain a sense of community by seeking out your peers and keeping a full life outside the office. ▶ 48

NEW THIS ISSUE

Career Adviser. Computerworld's bimonthly advice column. ▶ 66

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INSIDE: How Mickey Galatola of PECO Energy in Philadelphia is planning for the year 2000

WHAT TO SAY ABOUT Y2K

WANT TO GIVE LAWYERS A WAY TO PIN YOU to the wall in a year 2000 lawsuit? Just give someone — anyone — the wrong idea about how ready you are. But not saying anything can be just as bad. An effective communications plan can be the best defense, staving off lawsuits and keeping your customers and suppliers confident. The key is to disseminate an accurate message, but not one that can come back and bite you.

62

DREAM JOB HAS REAL PRESSURES

Special-effects CTO juggles uptime demand, search for IT talent

BY NANCY DILLON

IF THE STEREOTYPE that techies love science fiction holds any truth, many information technology people would consider H. B. Siegel one lucky guy.

The 37-year-old Siegel is chief technology officer at Industrial Light & Magic (ILM), George Lucas' special-effects studio in San Rafael, Calif., where an Imperial Stormtrooper greets visitors in the lobby and film crews race model spaceships in a nearby parking lot. Siegel even gets to

be an extra in the upcoming *Star Wars* prequel, due this spring.

But for all the sexiness of his environment, Siegel still grapples with the same practical challenges faced by any chief technology officer trying to establish a world-class tech shop — how to meet the relentless demand for uptime while recruiting in the face of an IT skills shortage.

One problem was the three years it took to recruit ILM's database administrator.

It took so long, he said, "I started grooming my 2-year-

old son for the position."

Joe Butt, an analyst at Forrester Research Inc. in Framingham Mass., said Siegel's labor hassles aren't that surprising. "In showbiz, computer artists are the No. 1 techies. This means IT folks become second fiddle," Butt said. "And [people] who are tech wizards don't want to be second fiddle."

The unmet demand for skilled hands is also fueled by the phenomenal systems growth ILM has seen during the past decade. When it did the special effects for *The*



INDUSTRIAL LIGHT & MAGIC CTO
H. B. Siegel gets to be an extra in the upcoming *Star Wars* prequel

Abyss in 1989, the artists used four Silicon Graphics Inc. servers connected directly to their monitors. Today, the ILM data center houses 50 SGI server racks for rendering and five SGI Origin file servers with 4T bytes of storage. Five hundred SGI O2 workstations

are distributed through the campus, and they all need tending by IT.

Another of Siegel's top objectives is to boost uptime from what he calls the "high 99s" to 99.99% by adding fail-over capabilities to graphics servers, centralizing informa-

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tion and adopting enterprise data-management tools such as Hierarchical Storage Management software. Gail Currey, ILM's chief operating officer, said the company has never had more than four hours of downtime at once, but the potential cost is enough to justify big spending on reliability.

"We would never even consider moving a deadline, so [downtime] means we have to bring in more machines and more people to make up any loss. And if we can't find more people, it means overtime," she said.

Siegel said designers are "killing themselves" to get the *Star Wars* prequel — ILM's biggest computing challenge to date — out by the movie's May deadline.

And if they beat the deadline, ILM staffers will get another perk — a private pre-release screening in ILM's plush private theater. ▀

OLDER IT WORKERS, BEWARE

Keeping skills current is essential, and you might have to do it on your own

BY BARB COLE-GOMOLSKI

IN THIS skills-driven labor market, many doors are open to workers who, despite a lack of experience, have up-to-date knowledge. However, the emphasis on hot skills presents a challenge to older IT workers who must keep their skills current if they wish to stay marketable.

Persuading companies to foot the bill for costly training, which can make employees

even more attractive to recruiters and competitors, is getting tougher, observers said.

"Generally, companies are not interested in making a heavy training investment [in information technology workers]," said Howard Rubin, chairman of the computer science department at Hunter College in New York. Companies are shelling out high salaries, and they expect workers to hit the ground running, Rubin said.

In addition, he said, the backlog present in many IT departments makes it difficult to fit training into the schedule.

However, the risks of not keeping skills current these days is great, said Bill Lockhart, a 61-year-old mainframe and midrange expert who worked at IBM until his job was eliminated in 1993.

Thanks to Y2K

It wasn't until last summer, when year 2000 projects started heating up, that Lockhart was able to secure another IT job.

Larry Larsen, 57, paid for courses in Web-page design when he found himself looking for work in the Silicon Valley area a few years ago.

Larsen had held several management positions in a semiconductor company, but it was the Web page know-how that got him back to work at an IT contracting firm.

Alex Tanasescu, director of MIS at Cupertino Electric Inc. in Sunnyvale, Calif., said he is much more likely to hire those who have sought some kind of continuing education on their own. Conversely, he's put off by those who make little effort to keep their skills current. "If they are not willing to make that investment, why should we?" he said.

The focus on skills has changed the whole IT employment picture, observers said. In the past, rewards were given to those who stayed with a company for a long time, said Mark Phillips, chief operating officer at Computer Technology Associates Inc., a Bethesda, Md., systems-integration firm. "If you had 20 years' experience and I had two, you were my boss," he said.

Today, your success is much more likely to be determined by what you can do, Phillips said. ▀

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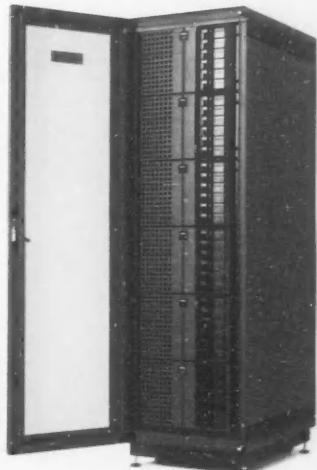
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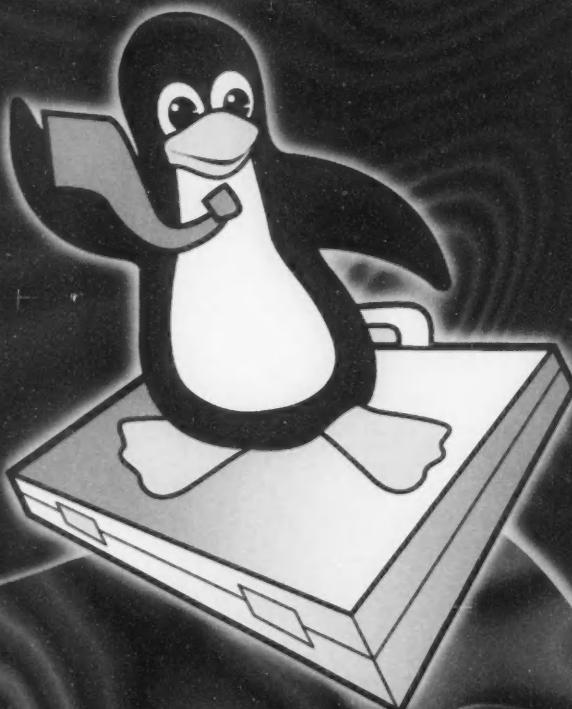
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January 11, 1999

evolution of the operational data store

Knowing where the operational data store best fits in the evolving information management scheme is the key to getting the most out of this valuable tool.

Among all the information management and decision support resources available today, few have been as widely debated in the past two years as the operational data store (ODS). The ODS was conceived to benefit frontline, tactical decision makers, just as the data warehouse was conceived to benefit analysts and strategic decision makers. However, although many companies have built what they call an ODS, there is often disagreement on just what it is they have actually built and whether it comprises the best architecture for the jobs at hand.

Part of the confusion stems from the term itself, which accurately describes several different concepts. Also, as ODS implementations proliferate and new technologies appear, people's understanding of the ODS concept and how it relates to other information management architectures is changing. For these reasons, companies should look beyond nomenclature and examine such real-life issues as workloads, data characteristics and applications. Once these issues are sorted out, they can implement the optimal solution—regardless of what it is called.

(more) ▶

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An ODS rarely exists on its own; it is almost always part of a company's information management infrastructure. Its functions draw upon, support and often overlap the functions of data warehouses, data marts and other elements of that infrastructure. These elements are defined here.

An ODS supports operational workloads. Typically, this mandates a more flexible, more normalized design than a data mart or a data warehouse would exhibit.

A *data mart* is typically a single-subject structure that accepts queries and supports a single function.

A *data warehouse* is an integrated, multisubject structure that accepts queries and supports numerous end users. The data typically is historical and highly detailed. For example, while a bank's data warehouse might provide a customer's daily balance for the past 12 months, the bank's ODS would provide the customer's current account balance.

An *enterprise data warehouse* (EDW) is often an E-R modeled database, or data hub, used to integrate data into a flexible structure capable of serving numerous information purposes. Rather than supporting end-user query, it is typically used to feed data into data marts or the data warehouse.

An *operational data store* contains current-valued, subject-orient-

ed, integrated data that reflects the current state of its subjects rather than providing historical snapshots of data. (That is, it contains the current content of the legacy production systems that feed it.) ODSs are updated via batch or trickling, not loaded and purged, and are therefore volatile. They are used to support operational queries (such as "What's my current account balance?") rather than analytical queries, although they can support analysis of the current situation.

Note: Some companies, mistaking the word *operational* to mean "transactions," have built transaction reservoirs and labeled them ODSs. This means that, unless the companies have made some other provisions, the transaction reservoirs are missing the critical ODS function of supplying data that reflects the current state of its subjects. The results of the query may be cumbersome. For example, does anyone really want to answer a question regarding current-balance amounts using millions of debit and credit transactions?

Workloads: this much is clear

Although there may be some quibbling about names, these definitions clarify several points about workloads. To begin with, an ODS supports operational workloads—that is, operational users such as customer service personnel making operational requests. Typically, this mandates a more flexible, more normalized design than a data mart or a data warehouse would exhibit.

Normalization is good for getting data into a database that needs constant updates, but it has a negative effect on getting data out. This

is because, in a normalized design, simple queries and extracts may involve joining tables.

On the other hand, data warehouses and data marts are built to support end-user query and analysis, which implies a dimensional design and some degree of denormalization. If relational, this means a star, snowflake, blizzard (a group of snowflake schemata integrated by sharing common dimension hierarchies), or constellation schema to support end users doing ad hoc or unpredictable query and analysis. The trade-off is that a dimensional model consumes loading resources, even as it makes it easier to get information out of the database.

Finally, an EDW is designed to feed multiple downstream data marts, data warehouses and other "information consumers" with as few restrictions as possible. Thus, an EDW, with its multitude of downstream "clients," must maintain a level of flexibility that might be lost in a dimensional model.

Starting out clean

Although characterizations such as these are useful in helping classify the data in an information infrastructure, they have little actual meaning to an implementation, with one exception: Components may need to be implemented on different platforms or within different databases. The reason for this is to take full advantage of platform capabilities specifically suited to given tasks or to effectively isolate one environment from another. Otherwise, everything we are dealing with is simply data.

For example, if we looked at an item table by itself, it would be difficult for us to determine if it was

| | Operational data store | Enterprise data warehouse | Data warehouse and data mart |
|-----------------------|--|---|---|
| Database design | Normalized (for fast update) | Normalized (for flexibility) | Denormalized (for fast online query) |
| Data (purpose) | Current state (for reference) Transactions (for lookup) | State snapshots and current (for extraction) Transactions (for aggregations) | Dimensions, hierarchical state (for query) Fact tables, aggregated transaction (for query) Potential transactions (for drill through) |
| Platform requirements | Transaction update High-volume lookup Large user base Extreme reliability | Bulk load Massive query (extraction) Batch operations Reliability | Bulk load and aggregation Fast query against aggregates Query management (queueing, and so on) Cost per query |

part of an ODS, an EDW, or a data mart. The real issues are: How many different environments do we need, and how do we draw the lines between them?

In its simplest form, most data coming into an information management environment is one of two types: state or transaction. State data conveys the current status of an entity; transactions are events that modify that state. For example, state data might describe the services to which an individual customer subscribes, or the customer's current account balance. Transactions can be call detail records, or credit card or point-of-sale transactions.

Although state data typically constitutes a very small percentage of all of the information in an information management environment, it is highly complex and has numerous attributes. Transactions, on the other hand, which account for the vast majority of available data, are typically less complex. Whereas loading state data might involve complex scrubbing and cleansing, transactions require much simpler, high-speed, bulk-load capabilities.

Where do we draw the lines?

The chart at the top of this page illustrates which environments—ODS, EDW and data warehouse or data mart—use which type of data and for what purposes. The chart also highlights the platform requirements of each environment. Although each environment has its unique needs, there is considerable overlap, particularly between the ODS and the EDW.

The traditional analytically-oriented decision support environment, composed of data warehouses and data marts, stands apart in that it requires a relatively denormalized schema to optimize it for rapid end-user querying. The ODS and EDW, on the other hand, are similar in design. Both require a normalized schema—the ODS to facilitate fast updates, the EDW for flexibility in feeding the downstream data warehouse and data marts. The result: a clear distinction between the data warehouse or data mart environment and the operationally oriented ODS and EDW environments. . leaving us to decide where to draw the line between the ODS and EDW, if at all.

Finding synergies

The closer we look at an ODS and EDW, the more apparent is the overlap between the data in these environments. Because data in an ODS is updated in place, the ODS excels at providing current valued information. The classic example is providing a customer's current account balance, which is solely an ODS task. But the ODS doesn't have a lock hold on all types of state information. For example, the current relationship between every one of a customer's accounts might be required by an ODS application but can just as easily be needed in an EDW.

Suppose we want to extract data to create a fact table that shows a customer's average monthly balance for several accounts combined. We'd need detailed historical account information, as well as the relationship of customers to accounts. State information is typically central to an enterprise's business, so most tasks or applications require it. This is why the traditional solution has been to maintain state data in multiple places with different characteristics—normalized in both the ODS and EDW, and then denormalized, or at least aligned, into dimension hierarchies in the data warehouse or data mart.

Transactions present an even greater challenge. Since 1996, an increasing number of companies have begun storing cleansed or enriched transaction records. Again, the challenge is that transactions are useful to a multitude of applications. A telco's call detail records could be used by an EDW to aggregate into fact records. Or they could be used for data mining, fed to a

billing system, or placed in an ODS for online access by customer service agents. Transaction data accounts for more than 60% of the data in most companies' information infrastructures. Given this kind of volume, do we really want to store all of this information numerous times?

Operational data warehouse?

The distinction between an ODS and an EDW seems fuzzier. Can an ODS evolve into an enterprise data warehouse? That is, given the proper technical platform, can the two constructs share data so a single infrastructure serves both as an ODS for end users and as a source for data marts? Although some data in the ODS is not relevant to an EDW, and vice versa, a great deal of data can be leveraged across both.

Once an ODS is built, we have a subject-oriented, integrated database that is synchronized with an enterprise's legacy operational systems. Some of the obvious tasks we can assign to it—aside from traditional ODS applications such as handling customer service inquiries and providing managers with high-level integrated current views—include feeding batch processing, data marts, and even online transaction processing (OLTP) systems in need of clean data.

Feeding data marts

It is not unusual to feed data from an ODS to an EDW, and from the EDW to various data marts, where it is stored as history. This further blurs the line between the ODS and the EDW, because two elements share large amounts of

data. Is it necessary, desirable or cost-effective to put data into an ODS, copy it to an EDW, then extract and aggregate the data into a data mart?

In some cases, it makes sense for the ODS to feed the data mart directly, rather than replicating the data. Whether this is feasible depends to some extent on the platform's ability to effectively manage resources and mix diverse workloads. It also depends on the specific data models required to support the ODS and the EDW.

Operational systems, such as billing and inventory, need clean transactions. If the cleanest transactions are in the ODS, that is the place to go. Historically, however, this has been difficult because of the technical limitations surrounding mixed workloads.

Feeding OLTP systems

An OLTP system that draws data from an ODS (or other source) may need to update the records. This introduces a new level of complexity as well as the question of where the "system of record" resides. It is now possible to connect applications via a message-based pipe, to more tightly integrate them in near real time.

As a result, leading-edge companies are looking to the synthesis of ODS and EDW to provide the foundation on which to build a "zero latency enterprise." At the very least, static supporting tables and lookups can be gathered from the ODS while updates are applied to new and old databases.

Evolving toward an EDW

The key to developing the ODS to take on these and related

tasks is the ability to handle mixed work loads. An enterprise data warehouse needs to reconcile transactional updates and bulk loads on the same platform. Its DBMS must balance efficiently the typically short, time-sensitive online queries of hundreds or even thousands of operational users against massive extractions. Furthermore, it must exhibit extreme reliability, including iron-clad data integrity, given the scope of its evolving role, and 24x7 availability for serving a large user community and for reliably feeding business-critical operational applications.

This has traditionally been a tall order, but technology has advanced a great deal in recent years. Companies are now in a position to evaluate information architectures that leverage these advances. Already, companies in the telecommunications, finance and insurance industries are proving that the ODS not only can evolve but is evolving.

By focusing on the functions rather than names, these forward-looking companies are leveraging the ODS evolution to streamline the efficiency and to boost the effectiveness of their information management and decision support systems.

► This article was contributed by Greg Battas, decision support and operational data store lead architect at Compaq's North American Tandem Division. He co-authored the book *Building the Operational Data Store* with William H. Inmon and Claude Imhoff (published by John Wiley & Sons) and has contributed directly to many successful ODS implementations. He can be reached at greg.battas@compaq.com.

ensuring the success of the “new”ODS

P

icture a typical EDW: large, fed by bulk loads and load appends, and handling massive query extracts and exports to downstream data marts. Now add thousands of customer service reps hitting against some of these same tables as they provide real-time answers to customer billing questions. Same data, same database, same platform, but with classic ODS functionality, directed I/O and sub-second response times.

Not long ago, this kind of mixed-workload, single-platform construct was practically unthinkable. But today, high-performance hybrid ODS/EDW solutions are being implemented more and more. Here is what is needed to make them work.

The ODS concept continues to evolve. Traditionally, an ODS was a

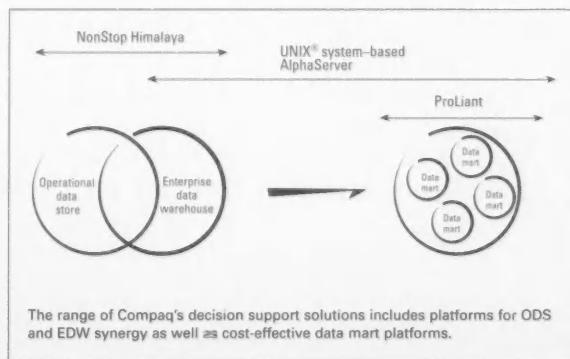
subject-oriented, integrated, volatile database reflecting the current state of the business. Without forfeiting any of the power and functionality implicit in this notion, an ODS now can assume additional application-driven and architecturally logical roles, including tasks typically performed by an EDW, such as feeding downstream data marts, batch processing and OLTP systems.

With more companies merging ODS and EDW roles, the most commonly asked questions revolve around how these two constructs—combined to share data resources—can coexist on the same platform. An ODS requires fast transactional updates, while an EDW is fed by bulk loading. An ODS should be able to consistently deliver subsecond responses to a di-

verse community of users (including a potential host of Web-enabled employees, customers and partners), whereas an EDW is designed for massive query extract and export.

By all traditional measures, the ODS and EDW merge seems like a stretch. Compaq, however, is enabling a growing number of corporations to implement just such a new-generation solution—combining traditional ODS and EDW functions on the same scalable platform as part of a streamlined business intelligence environment. Compaq, through its Tandem Division, has a long history of providing market-leading decision support solutions. Along with underpinning many of the world's most advanced decision support solution (DSS) initiatives, Compaq has received recognition through two awards: The DCI Data Warehouse World 1998 Excellence in Business Information Award, for its data warehouse at the USAA Casualty Indemnity Co.; and The Data Warehousing Institute's 1998 Best Practices Award, conferred on Dayton Hudson Corp. for its NonStop® Himalaya® server-based data warehouse, one of the largest in the world.

Today, Compaq supplies platforms capable of meeting the full range of DSS architecture requirements.



Compaq ProLiant and AlphaServer platforms exhibit excellent price/performance characteristics for data marts and data warehouses, and provide the widest partner support in the industry. The AlphaServer platform, with its TruCluster option, also scales to support large data stores such as EDWs, providing high-bandwidth I/O for extracts and loads, and exhibiting the reliability that EDWs require, due to their hub position in an information management infrastructure. For an ODS or a hybrid ODS/EDW, Compaq's NonStop Himalaya platform supports massive tables and databases and provides massively parallel processing to numerous users.

Residing on the high end of the reliability and scalability spectrum, the NonStop platform consists of NonStop Himalaya servers running the NonStop SQL database management system. An ODS requires a system equally adept at handling OLTP and DSS tasks.

This characteristic is even more important for a new-generation, hybrid ODS/EDW. With NonStop servers and NonStop SQL software, Compaq is the only vendor that can run the largest-scale decision support systems on the same platform used to process 90% of the world's stock transactions.

Whereas other decision support database vendors have improved the DSS performance of their offerings at the expense of OLTP performance, Compaq has become a leader in DSS without sacrificing the NonStop platform's OLTP leadership. In so doing, Compaq avoids techniques such as prejoined indexes that help queries but that negatively affect the kind of around-the-clock updates that an ODS has to make. Instead, performance is enhanced continually by adding features and technologies that can be leveraged

across both DSS- and OLTP-type tasks.

As a result, Compaq today supplies the only platform capable of meeting every architecture requirement for a large-scale ODS or hybrid ODS/EDW, including business-critical reliability and availability; proven scalability; mixed-workload management capabilities; complex query optimization; very large database management capabilities; minimal indexing; and high-performance OLTP.

Ensuring ODS reliability

ODS implementations require extremely high reliability (that is, data integrity plus high availability) due to the business-critical nature of opera-

An ODS/EDW based on NonStop SQL at a European telco is nearly 1.7TB and supports online operational queries from 18,000 customer service personnel.

tional queries from online workers. ODS applications that take on EDW tasks require the same. Whereas lower reliability systems may be suitable for less critical DSS functions such as data marts, an ODS based on the NonStop platform benefits from the same reliability that underpins the majority of the world's automated teller machine, POS and securities transactions.

The NonStop architecture—parallel to its very core—unites hardware and software to achieve the highest levels of availability and data integrity.

A NonStop Himalaya server is a message-based, shared-nothing cluster of loosely coupled processors, working independently yet in parallel. As a by-product of this parallelism, system software swiftly and transparently redistributes work to other processor nodes in the complex in the event of hardware or software failure. As a result, open files remain open, data is not corrupted, and complex database queries rarely have to be started over.

The NonStop platform's shared-nothing parallelism also provides cost-effective, near-linear scalability in the face of swelling data volumes, expanding user populations, and growing numbers of concurrent queries. Already, an ODS/EDW based on NonStop SQL at a European telco is nearly 17 terabytes in size and supports online operational queries from more than 18,000 customer service personnel.

As database content grows in size and complexity, and as the volume of queries against it multiplies, a parallel DBMS such as NonStop SQL truly comes into its own. NonStop SQL can transparently partition the massive tables that can characterize ODS and EDW applications across thousands of disk drives, each of which can be accessed in parallel.

Therefore, a table of one or more terabytes can be partitioned by account number and can reside on any number of drives. The distribution of data remains entirely transparent to the SQL statement or user query tool. In addition, unlike most hash-based distribution mechanisms where access patterns are unpredictable, NonStop SQL enables a database administrator to allocate and balance I/O activity to achieve maximum performance.

Mixing workloads

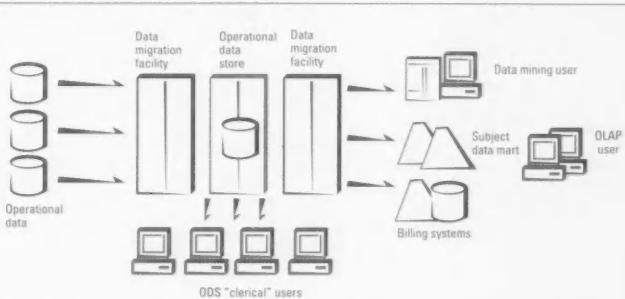
Managing mixed workloads generated by diverse users has always been a challenge for decision support databases. How, for example, do you best balance simple queries against more complex queries, or ad hoc versus structured queries? While some DBMSs are very good at these basics, an ODS or a hybrid ODS/EDW significantly ups the mixed workload ante. Now you have to deal with a mix of insert,

update, bulk loads, trickles, large queries (extracts), medium queries (operational analysis), and time-sensitive OLTP-type queries (operational end users), all in high volume.

NonStop SQL is unique in the DBMS industry in that it handles all types of workloads executing concurrently on the same server, despite very different I/O profiles and priority requirements. Priorities can be assigned to individual queries based on the urgency of the information or the expected execution cost in terms of I/O and processor cycles. These priorities are maintained even when requests are passed to other processors in the same loosely coupled NonStop Himalaya server.

Similarly, I/O requests are queued to the NonStop SQL data access manager in priority sequence and are processed only when they are the highest priority requests executing in the processor. Even if the disk process is performing a massive table scan on behalf of a query, it will continue checking the queue for higher priority queries. Should one arrive, it will be threaded immediately into the workload to ensure predictable response times.

These mechanisms provide un-



NonStop Himalaya and NonStop SQL feed a series of data marts and data mining systems, as well as customer support agents and billing systems, to form a single consistent, current data source in an ODS implementation.

equaled mixed workload support, allowing an ODS or hybrid ODS/EDW to achieve high performance on operational queries even when massive loads and extracts, maintenance operations, or data mining or OLAP queries are performed concurrently.

Advanced parallel query

Parallelism is a key enabler of query speed-up and scale-up. Hence, a minimal requirement for a DSS database is the ability to execute multiple SQL statements, as well as the elements of a single SQL statement, in parallel. Most DBMS providers are relatively new at providing parallel SQL features and do not support a complete parallel SQL environment. NonStop SQL, on the other hand, provides a full parallel SQL implementation, including parallel SELECTs, INSERTs, UPDATEs, DELETEs, sorts, joins and aggregations.

Architecturally, aggregations, joins and other SQL operations are executed at a very low level in the operating system and directly as the data comes off the disk. This means that path lengths are minimized and only relevant data is actually passed from the operating sys-

tem to the DBMS. Query performance is further enhanced by a number of advanced join and aggregation algorithms and innovative access methods, all designed to eliminate sorts and wasteful scan I/Os and to minimize indexes.

The mechanics of these advanced techniques, and decisions on when and how to use them, are completely transparent to users and applications. Instead, queries are rewritten by a robust optimizer that combines both rule and cost-based optimization in a single algorithm. Although an ODS/EDW must support complex joins of multiple tables as data is extracted from its normalized schema, the NonStop SQL optimizer selects the most efficient way to provide the requested data without hints from the user. In addition to determining optimal access methods and algorithms, the optimizer also considers table statistics, parallel versus nonparallel plans, and cache utilization.

Large database manageability

Managing a large ODS requires four things: 1) the ability to manage the database granularly—that is, performing operations on a single partition on a single disk, if necessary; 2)

the ability to manage the database in parallel, because nonparallel management operations can take an excessively long time to complete; 3) the ability to manage the database online without uninterrupted operations; and 4) the ability to manage the database in a protected fashion.

The ability to work on only "part" of a table or index is key to reducing the scope and consequently the length of an operation. With this in mind, NonStop SQL provides manageability right down to the individual partition of a table or index, so you can:

- add an empty partition to a table or an index
- drop an unwanted table or index partition
- move the table or index data from an existing disk partition to another disk
- split the data in a table or index partition, moving half of the data to another disk partition
- move table or index data from a partition to another disk partition based on the range of clustering keys
- combine table or index data from multiple disk partitions into a single partition
- reorganize table or index data into contiguous locations on the disk to permit large block read/write operations
- backup, recover or restore a table or index partition

The implicit parallelism of NonStop

SQL is likewise essential to reducing the length of operations. The partition level operations listed above all support parallel execution, thus providing dramatic reductions in the amount of time required to complete the operation.

The window for maintaining an ODS, never large to begin with, is shrinking. Some companies are already demanding zero downtime (that is, usage concurrent with query processing). NonStop SQL enables maintenance to be performed on a table even while it is being read, written to and updated.

For example, a major retailer amended a NonStop SQL table several hundred gigabytes in size, that resided on 180 disks; the retailer split each partition in half, moving more than 100 gigabytes of data, ending up with 360 partitions, while users continued addressing the table. This is in direct contrast to any other DBMSs that would first take the table offline, drop all of the indexes, run a reorganization, and then rebuild all of the indexes before allowing users to access the table again.

The integrity of all operations must be protected to ensure the accuracy and recoverability of the database. NonStop SQL is well known for its physical and logical data protection capabilities, as well as for its numerous parallel recovery features, which include transaction back-out to a consistent database state in the event of failure as well as auto rollback of protected tables and indexes.

NonStop SQL also supports the kind of flexible data loading and data maintenance capabilities required by

hybrid ODS/EDWs. This means supporting rapid bulk loads, as well as large sequential or random I/O insertions and updates through its parallel loading capability. The NonStop platform can also host the preprocessing logic and code for transforming and maintaining an ODS or an EDW, or both. In addition to cost-effective preprocessing, the same computing resources can be used concurrently for processing queries as needed.

End-to-end solution

NonStop SQL running on NonStop Himalaya servers is proving itself to be an excellent platform for the ODS and for new-generation ODS/EDW constructs, based on its unmatched reliability, near-linear scalability and mixed-workload abilities. Serving a growing number of online operational users, the ODS is extremely business-critical, whereas a combined ODS/EDW provides the foundation for the entire business intelligence environment.

With the NonStop platform, Compaq provides a flexible, growth-oriented architecture for these kinds of business-critical, infrastructure-type applications. In concert with the AlphaServer and ProLiant platforms, the NonStop platform anchors Compaq's complete set of end-to-end business intelligence solutions, addressing the full spectrum of enterprise decision support—from data marts to ODS/EDWs, and from packaged to integrated solutions.

For more information, access the Compaq website at <http://www.compaq.com>.
Send Internet e-mail messages to info@tandem.com

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BUSINESS E-COMMERCE

BRIEFS

Web Spending Up

The number of shoppers who logged on and made purchases over the Internet nearly doubled this holiday season compared with 1997, according to Zona Research Inc. Online spending averaged \$629 per person, a 191% jump from the previous year's \$216, Zona Research reported last week.

Adobe Purchase

Looking to juice up its offerings for customers who publish material on the Internet, Adobe Systems Inc. last week said it had acquired privately held GoLive Systems Inc. for an undisclosed sum. GoLive, based in Menlo Park, Calif., makes GoLive CyberStudio, a professional Web design and publishing software, and the GoLive Web publishing system.

Trading Site Grows

ETrade Group Inc. in Palo Alto, Calif., has announced that its Destination ETrade Web site (www.etrade.com) has attracted 500,000 members since its September launch. Members of the financial services Web site deposit at least \$1,000 to open an account and can then trade online and receive instant quotes, portfolio tracking, market analysis and customized alerts via the Web or E-mail.

SNAPSHOT

Holiday Shopping

Top online site categories visited by respondents, week of Dec. 18, 1998

Audience reach: Online site

15.9% Books/CDs

15.8% Specialty*

13.0% Computer products

10.9% Auction

8.8% Entertainment

*Includes greeting cards, perfume, chocolate, flowers, wine and gourmet foods
Base: Measurements of more than 4,000 adults accessing the Web from home

BANKS EYE ONLINE BILLING

Internet represents threat as well as opportunity in lucrative line of business

BY SHARON MACHLIS

AN ATLANTA utility isn't using a bank for an upcoming pilot that will let customers view and pay their bills on the Web. But it might have, if local banks had such services available.

Banks, said Will Knight, manager of electronic marketing at Southern Co. in Atlanta, will be "passing up a huge opportunity" if they don't get involved in this segment of electronic commerce.

Stakes are substantial. Helping large companies manage billing issues is a crucial part of many banks' most lucrative line of business: cash management services, which analysts say account for 30% to 50% of some banks' profits.

And consumers will view about 8 billion bills on the Web by the end of next year, ac-

cording to Killen & Associates, a Palo Alto, Calif., consulting firm.

It will help if nationwide standards emerge and allow billing data to easily be presented in the same format using different back-end software, many bankers said.

Yet even without such standards, some banks have plans to jump into the business

called electronic bill presentment and payment (see box).

"That's going to be a killer application," predicted Edgar Brown, senior vice president of First Union Corp.'s consumer group. The Charlotte, N.C.-based bank last fall launched bill

viewing and payment on its Web site.



First Union's Edgar Brown sees "killer app"

For consumers, the appeal is convenience. For billers, there's a chance to cut printing, mailing and processing costs — and, perhaps more important, build a closer relationship with customers.

Killen estimated electronic bill presentment costs about 50 cents per bill — compared with 60 cents to \$1.40 for paper.

Southern Co., which sends out about 3.5 million bills each month, wouldn't discuss specific numbers, but Knight said the utility already achieves good economies of scale when sending out its paper bills.

Internet billing will still save enough to pay for the information technology investment, but Knight said he believes Web bill presentment is even more attractive as a way to sell more services to customers. "We think this is the tip of the iceberg if done right," he said.

Ultimately, he said he expects Southern Co. to offer electronic bills in three places: its own site, nonbank third-party sites such as CheckFree's and bank sites. ■

Early adopters of online billing

Banks experimenting with Internet bill presentment and payment include the following:

- First Union customers can view their utility bills (from BellSouth and Florida Power & Light Co.) online and then pay them at the First Union Web site.
- Bank of America last month launched an organization, the Strategic Technology and Integrated Payment Services group, which will be working on Internet billing options.
- PNC Bank in Pittsburgh has signed relationships with two major players, CheckFree and TransPoint, a joint venture of Microsoft Corp. and First Data Corp. — Sharon Machlis

Retailers Find Uses for Web Inside Stores

Browsers at point of sale help sell more than what's on the shelf

BY DAVID ORENSTEIN

As a retailer that equips explorers for the great outdoors, Recreational Equipment Inc. (REI) in Kent, Wash., has been eager to explore the Internet. This year, its cash registers will be linked to the Web.

Selling online became a major priority last year, but retailers are investigating how they can use the Web in their brick-and-mortar stores as well.

"Everyone assumes it's going to happen, but the question is 'How deep into the store?'" said Donald Bellomy, an analyst at Aberdeen Group Inc. in Boston.

REI, a cooperative with 1.5 million members and 51 stores nationwide, began testing new sales terminals equipped with

Web browsers at its Linwood, Wash., store last July. During the next nine months, the chain will install the systems in all of its stores, said Jim Smith, REI's retail operations administrator.

Store clerks will be able to use the Windows NT-based registers to look up product and company information and place orders via REI's Web site. The 3-year-old site (www.rei.com) has been surprisingly successful [CW, Dec. 14].

"[The site] is becoming our major repository of product information," Smith said. The cashiers also can use REI's site to sell items that are out of stock at a particular store but are available online.

Eventually, the Web site will completely replace the current mainframe-based, in-

store ordering system, Smith said.

Browsers at the point of sale are most appropriate in specialty stores, where service at the register is at least as important as speed, Bellomy said. Cashiers with access to customer data, for example, can provide more personal service and also remind customers of appropriate promotions, he said.

REI already has installed kiosks that let customers order products as they browse the merchandise on the sales floor.

Other companies also are experimenting with in-store Web access.

For example, San Francisco-based Gap Inc. lets shoppers in a down-

town store navigate its site.

And Burlington, N.J.-based Burlington Coat Factory Warehouse Corp. is developing a Java-based baby-gift registry that will be deployed in stores this year. The same application then will be extended to the Internet, said MIS project manager Jodi Golub.

Burlington Coat also plans to roll out its intranet to stores this year, which eventually will bring inventory management data to its managers. ■



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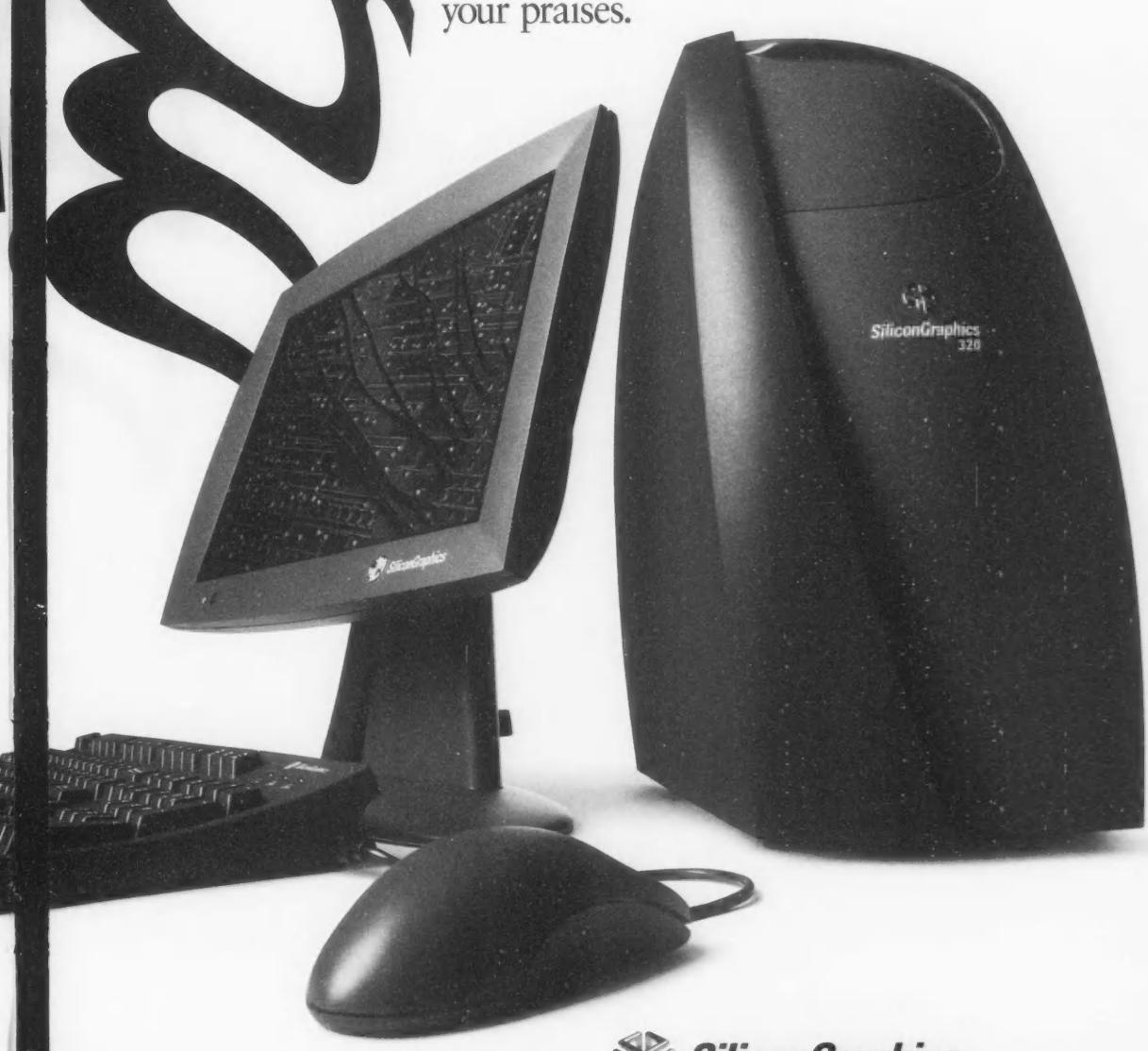
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BRIEFS

Prison Hires Unisys

The Georgia Department of Corrections (GDC) has hired Unisys Corp. in Blue Bell, Pa., to help make its computer systems year 2000-compliant. The largest of the three contracts, which are worth a total of \$5.2 million, involves two Cobol applications running on a Unisys enterprise server: the Offender Tracking Information System and a food services application used to manage the distribution of food to the GDC's 84 detention facilities. In a second contract, Unisys will check the status of GDC embedded systems in five risk areas: security and surveillance systems, lighting control systems, fire detection and alarm systems, medical equipment and general office systems.

Health Care Notice

Rx2000 Solutions Institute, a Minneapolis-based nonprofit organization, has established a Rapid Response Communications Center to alert hospitals and clinics to year 2000 bugs in computers and medical devices. Providers can call (888) 835-4478 or (612) 835-4478 and leave a message about any year 2000 problem they have encountered. The information then will be made available as an E-mail alert to health care members through the Rx2000 list server and Web site (www.rx2000.org).

Not Ready After All

In Singapore, 300 cabs in a fleet of 1,500 saw their new - and supposedly year 2000-compliant - fare meters go blank for up to two hours on New Year's Day, according to local media reports. The glitch, which hit the Tiba Co., forced drivers to get emergency repairs, according to a local newspaper.

Funding Woes

How bad is the year 2000 problem in some nations? So bad that two-thirds of the 100-plus attendees at a United Nations summit on the millennium bug held in New York last month had to rely on the World Bank to pay their airfare. Said Howard Rubin, a research fellow at Meta Group Inc. in Stamford, Conn., "If they can't afford airfare, how are their nations going to fund Y2K?"

AMADEUS READY TO ROCK 'N' ROLL

Miami-based travel services company says global reservations network up and running

BY THOMAS HOFFMAN

When it comes to the year 2000 problem, much of the focus for the travel industry has been centered around whether air traffic control systems will be able to work properly at the dawn of the millennium.

But more important for a big travel service firm such as Amadeus National Marketing Cos. in Miami is whether its 190,000 terminals are going to work at 44,000 worldwide travel agency locations, 490 airlines, 60 car-rental companies and more than 50,000 hotel properties. Amadeus NMC markets Amadeus products and services to travel agents in the U.S., Canada and Mexico, as well as Guam, Central America and other places worldwide.

Computerworld senior editor Thomas Hoffman recently booked some time with Jim Davidson, the 43-year-old president and CEO of Amadeus NMC, to discuss the critical year 2000 issues that Davidson's organization faces.

CW: How involved are you in Amadeus' year 2000 project?

Davidson: Other than waking up in the middle of the night in a cold sweat... I'm very much



CEO Jim Davidson says his company was ready in 1998

involved. In the marketing area I represent, we have our own initiative where we hook in with our customers and networks in North America.

We have a year 2000 project office that reports to me on a monthly basis. They report project status, time lines, etc. If parts of the project are 15% above budget, they are required to discuss that with me.

CW: In which cases have costs exceeded estimates?

Davidson: Some of our large travel agency customers need to test their reservation systems against ours.

Air France has been very helpful in setting up tests with us.

CW: When will Amadeus begin hitting against year 2000 dates?

Davidson: We [had] to be flight-ready Jan. 4, 1999, since we're processing reservations a year out.

CW: How date-sensitive are Amadeus terminals?

Davidson: We have 30,000 workstations in the North American market, and we will

have to replace about 10% to 15% of those workstations.

CW: How much will that cost Amadeus?

Davidson: For 3,000 to 4,000 workstations, the investment would be \$4,000 to \$5,000 [per workstation, or \$12 million to \$20 million].

CW: What's the status of the Amadeus reservation system?

Davidson: Right now, we're post-testing [our host system] with our travel partners, such as cruise companies, airlines, etc.

For all practical purposes, we're ready to rock 'n' roll. We've been ready since about midyear '98.

CW: Where do you expect to be on New Year's Day 2000?

Davidson: I won't be pacing back and forth in the [Erding, Germany] data center, but I will be receiving [pager] alerts. ▀

Mediation Moves Into Corporate Spotlight

Dispute resolution pegged as low-profile way to settle year 2000 legal conflicts

BY KATHLEEN MELYUKA

There may be a less painful alternative to litigation for some of the trillion dollars in legal claims expected to arise from year 2000.

Alternative dispute resolution provides a cooperative forum for untangling year 2000 legal webs through mediation rather than trial.

"It's somewhat like a judicial proceeding but there's no judge, no jury and it's done

informally," said Robert F. Brodegaard, head of the Y2K task force at the New York law firm Thacher Proffitt & Wood.

It can take the form of arbitration, in which the arbitrator's decision is binding, or — more likely in year 2000 disputes — mediation, where the mediator brokers an agreement between the parties.

Organizations such as the American Arbitration Association can suggest mediators, who are agreed upon by both parties.

Mediation offers several advantages over a court proceeding, Brodegaard said, including the following:

- It's shorter and less expensive than a typical lawsuit.
- It allows the parties to select a mediator with knowledge of technical issues and to work together to tailor a mutually agreeable settlement.

■ It allows vendor and customer to continue to work together on critical information technology projects while addressing the dispute.

■ It provides confidentiality, keeping all issues out of open court.

■ It gives closure, since the parties agree on a settlement.

Mediation is constructive rather than adversarial. "It's more inclined to preserve the relationship between the parties than a lawsuit," Brodegaard said. For that reason, it won't work in certain cases such as class-action suits or a suit in which one party has suffered catastrophic losses.

The great advantage is it's private, Brodegaard said. "Everything is confidential. There may be Y2K mediations going on right now, but we wouldn't know about them."

The idea is catching on. Recently a dozen Fortune 500 firms signed a pact agreeing to mediate rather than sue in the case of year 2000 disputes [CW, Dec. 7, 1998]. ▀

SNAPSHOT

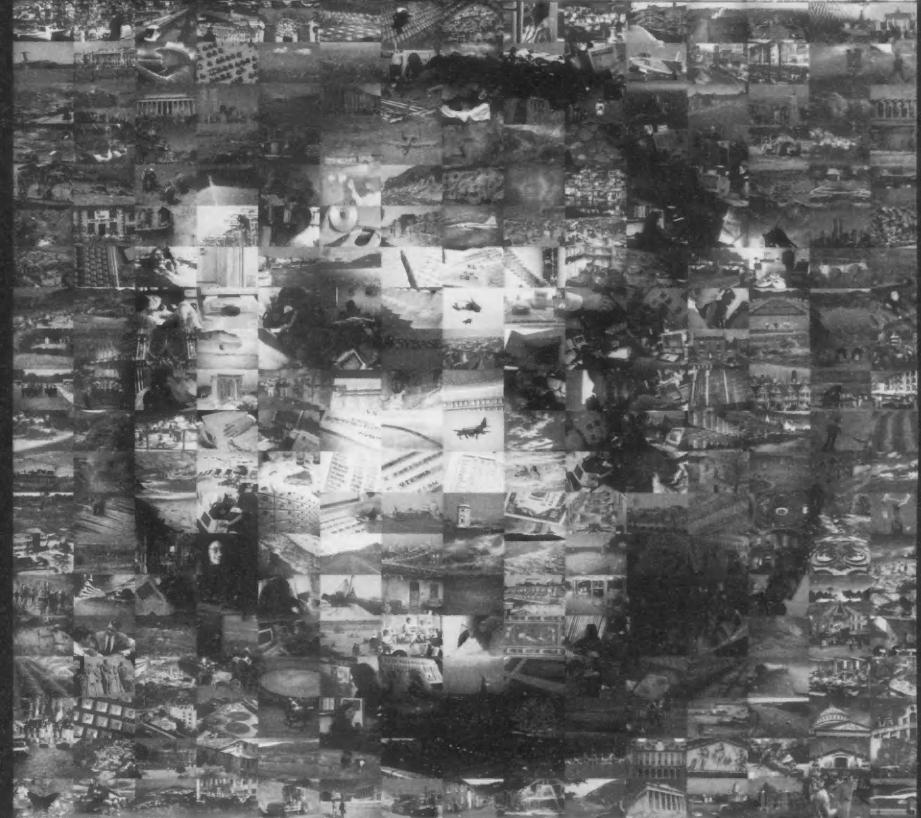
Competitor Comparison

As their merger comes together, how do the year 2000 remediation efforts of Mobil and Exxon stack up?

| | EXXON | MOBIL |
|---|------------------|---------|
| Fortune 500 rank | 3 | 8 |
| Spending as of Sept. 30, 1998 | \$130M | \$89M* |
| Estimate of total Y2K cost | \$250M to \$275M | \$200M* |
| *Mobil estimates it will spend another \$290 million on new systems to improve business functionality while also providing year 2000 compliance. It says it spent \$154M of that amount through Sept. 30. | | |

SOURCE: FORM 10-Q FILINGS WITH SECURITIES AND EXCHANGE COMMISSION, BOTH DATED NOV. 12

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BREAK THROUGH THOSE BARRIERS

Being an independent contractor can be a lonely life. Here are some consultants' tips for maintaining community on the job

BY FAWN FITTER

SOME CONSULTANTS find the downside of their independence is that jumping from gig to gig, client to client and project to project makes it nearly impossible to connect with their co-workers.

Let's face it: No matter how much you love what you're doing, it can be hard to feel anything other than isolated and left out.

Imagine when, after two months of 55-hour weeks on a client site, the client asks you to come in on the day of the company picnic. After all, someone needs to be in the office while the real staff plays Frisbee and grills burgers.

In one sense, consultants are like the Lone Ranger: They sweep in, solve a problem, accept applause and (hopefully) a fat paycheck for their efforts. Then they ride off into the sunset without looking back.

On the other hand, staffers may see consultants as mere temps who aren't worth inviting to lunch or asking to the company holiday party. After all, they'll be gone soon, anyway. But there are ways to build a sense of connectedness and community. The following are some ways to approach it:

1. Network With Your Peers

Information technology consultants often don't fit in well

where they work because people don't see them as peers but as vendors who provide a service.

"If you're having a beer at the company's weekly beer party, someone will walk up to you and ask for a backup," quips J. Eric Townsend, a Unix consultant for almost 15 years in the San Francisco Bay area.

Chances are you have more in common with other consultants than with the permanent employees you see every day. So find those other consultants and cultivate them.

"Connecting with professional peers is good both for social contact and problem-solving," says Janet Ruhl, who runs the Computer Consul-

tant's Resource Page (www.realrates.com), home of the Real Rate Survey. "They can provide leads when you can't find work on your own and they can make it easier to deal with the always-troubling questions of 'How's the market?' and 'What should I be learning to keep myself marketable?'

2. Be the First to Reach Out

When Denver-based consultant Doug Everitt hears about other contractors who feel isolated, he has one piece of advice: "Social skills, social skills, social skills," he says.

Don't be afraid to schmooze a little.

It may sound obvious, but it's up to you to smile, make eye contact and initiate the occasional conversation. Waiting for people to come to you with instructions and information will leave you isolated in your cubicle.

3. Log In to Link Up

Building a network of outside friendships with other consultants is easy if you look for

them on bulletin boards, newsgroups and mailing lists.

For example, every day there are 200 or more messages posted to the bulletin board service Ruhl runs at www.realrates.com/bbs/.

Townsend likes the newsgroup alt.sysadmin.recovery because participants have to know how to create Usenet postings just to be able to post to the group.

"You have to have a certain amount of expertise to participate, so it's self-motivating," he says.

And there are mailing lists for just about everything, from Unix security issues to women in computing.

"If you can't find something to suit your particular tastes, start a list of your own," Townsend says.

4. Be a Joiner

Get involved in various real-life organizations, from technical special interest groups to professional organizations.

If that doesn't present enough opportunities, contract shops often host Birds of a Feather meetings, where people meet to discuss a particular subject.

5. Don't Expect to Make Friends

Consulting doesn't just pay better than staff work; it also insulates you from the tedium of office politics.

You show up, you do the work, you get a check and you leave.

Brian Battuelo, a mainframe consultant in Stamford, Conn., has been at a long-term consulting gig for the past 18 months and considers it "the perfect situation. I'm invited to luncheons and other events, but I don't have to go to the big strategic meetings," he says.

Being on the outside looking in can have advantages, Battuelo says.

"A lot of people are happy being invisible for \$120 an hour," Ruhl notes.

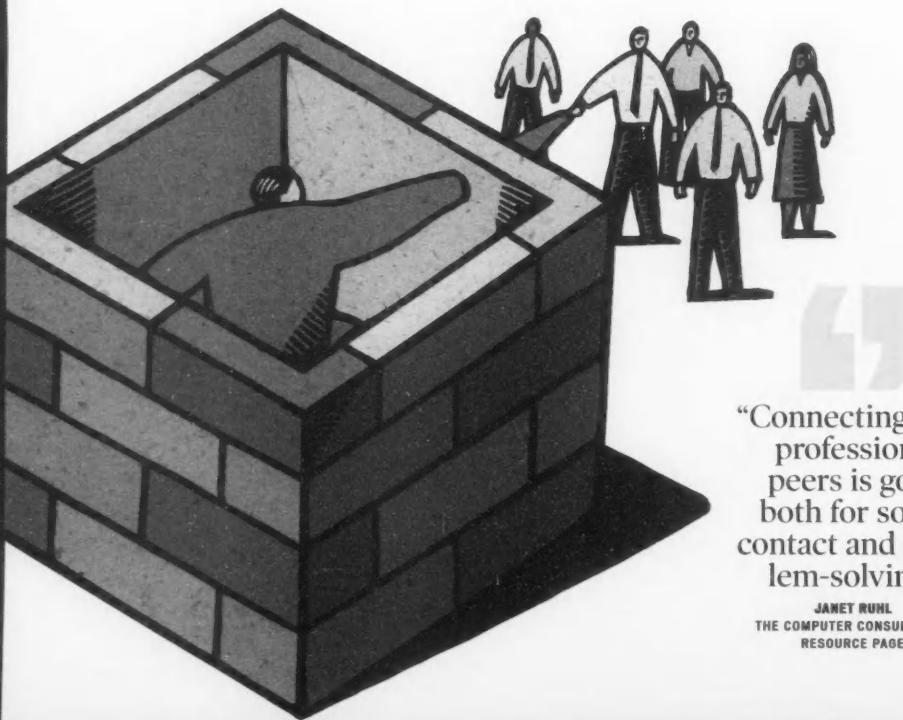
"Emotional connection and business connection are two entirely different things. If you're the kind of person who needs a lot of emotional relationships with the people you work with, you'll be miserable as a consultant," she says.

"Connecting with professional peers is good both for social contact and problem-solving."

JANET RUHL
THE COMPUTER CONSULTANT'S
RESOURCE PAGE

RANDY L. HUBBELL

Fitter is a freelance writer in Brighton, Mass.



NEW REPORTS

Helping Online Retailers Grow

Jupiter Communications Inc. has announced its "1999 Online Shopping Report," designed to help merchants compete and grow online.

According to the New York firm, the report contains profiles of more than 30 leading companies, revenue projections from 1998 to 2002 and data from an executive survey of online merchants. It examines online sales of books, videotapes, software, music, PCs, toys, groceries, travel, flowers and clothing.

The report costs \$3,495. Jupiter Communications (212) 780-6060 www.jupitercommunications.com

Aligning IT and Business Goals

Giga Information Group Inc. has announced "Aligning Information Technology with Business Goals: Techniques and Tools," a report for IT executives seeking closer ties to business.

According to the Cambridge, Mass., company, the report outlines the steps needed to change IT from a support function into a business partner with influence over an organization's strategic planning.

The report costs \$1,495. Giga Information Group (781) 792-2600 www.giga.com

Web Seer

International Data Corp. in Framingham, Mass., has released a list of predictions for the 1999 online market. According to Frank Gens, senior vice president of Internet research at IDC, Internet usage will increase to 147 million users worldwide this year. Web access will become available in many retail stores, and worldwide electronic commerce will more than double, to \$68 billion.

Gens also predicts that women will become the

online majority in the U.S. this year and that 51% of Internet users will live outside the U.S.

IDC is a sister company to Computerworld. International Data Corp. (508) 872-8200 www.idcresearch.com

Net Finance, Euro-Style

Forrester Research Inc.'s European Research Center has announced "Adding Value to Net Finance." The report projects that online financial services will attract 10 million users in Europe by 2003. According to the Amsterdam-based center, the report is based on interviews with 52 European financial institutions regarding their online activities. Of the firms interviewed, 65% already offer basic transactions such as balance inquiries and funds transfers on their sites, and 35% offer advice on how to better manage personal finances.

The report is part of a one-year subscription service that varies in price.

Forrester Research (617) 497-7090 www.forrester.com

5-Year CRM Market Forecast

AMR Research Inc. has announced its "Customer Relationship Management Software Report, 1997-2002," which forecasts a 56% annual growth rate in the CRM market leading up to 2002. According to the Boston firm, total revenue in that market is expected to grow from \$1.2 billion in 1997 to \$11.5 billion in 2002.

CRM software is defined as both technology-assisted selling software and customer support software. AMR expects leading enterprise resource planning vendors to offer complete CRM suites by next year.

The report costs \$3,500. AMR Research (617) 542-6600 www.amrresearch.com

PETER G. W. KEEN

IT is wired to 'outward' thinking

AFTER 20 YEARS, the era of "distributed" computing is over. Quite literally, everything in IT is turning inside out. The combination of digital cell phones, wireless, voice-over IP, consumer electronics, call centers and innovations such as the PalmPilot make two things inevitable: The human voice, not the keyboard, will be the computing tool of choice, and companies will have to respond by building new architectures.

The signs of future shock are already apparent. But there are CIOs who oppose allowing personal digital assistants (PDA) or cell phones with an integrated browser to have access to the corporate network. One CIO explained to me why he "hates" laptops: They put "my" (his word) infrastructure at risk. He hates the new tools that intrude on security, network management, scalability and other elements of corporate information technology operations. But customers love them.

The Achilles' heel of today's distributed architecture is that it begins inside the business and extends outward. Every IT innovation has facilitated more distribution — PCs, client/server and the Internet have extended the reach of the IT platform. It has meant that the architecture dictates what tools individuals must use.

That's changing completely. The tools users prefer will dictate the architecture. For lack of a better term, I call these tools Customer Preference Technologies (CPT). Exactly what they will be is evolving, but we know a good deal about what people like in an IT tool:

- People like to talk. That's not an issue of phones vs. PCs. Voice is the main medium of human exchange. The cell phone hit the 10 million-user mark faster than VCRs, PCs or the Internet. Call centers have become the moment of first impression for more consumer-business transactions.

Voice will be a primary driver of CPT. Voice-over IP ends the separation of voice and computing. The forthcoming PDQ smartphone from Qualcomm in San Diego — a combination of a high-speed digital phone and PalmPilot PDA — is one of the flood of innovations expected this year.

- People prefer simple tools that handle specific tasks. This is at the heart of the conflict between corporate computing and CPT. Yes, Windows is

everywhere. But DOS is a descendant of IBM's core operating systems, and Windows 98 and NT were designed to handle enterprise computing. The success of the PalmPilot — reportedly rejected by Silicon Valley PC vendors because it lacked "features" — indicates that simplicity sells. So, too, is the fact that simple E-mail remains the Internet's most popular feature and that the successes in electronic commerce have been simple-to-access, simple-to-use services such as Amazon.com.

- People prefer small, portable devices. Cell phones, laptops and PDAs get smaller and smaller. Discman and Game Boy are carried by millions. Add wireless to them and make them IP-addressable, and they will be the preferred Internet access tools for many people seeking entertainment from the Net.

If even 20% of your customers prefer a Qualcomm PDQ over a PC or speaking to a human instead of self-service via a PC, then your firm must incorporate those preferences into its IT architecture. There are plenty of reasons to believe that far more than 20% of the tomorrow's customers will make wireless, voice-based consumer electronics their tool of choice, with the PC a secondary tool.

My recommendation to IT professionals: Get rid of the legacy distributed computing mind-set. Think wireless, consumer electronics, voice and IP; think Sony and Nokia. Forget about blocking laptop,

PDQ and PalmPilot access to your Internet services because of security problems or network management issues. Customers have more choices, and they won't have to conform much longer to the old requirements of corporate computing. ▀

The human voice will be the tool of choice.



Keen is co-editor of the newsletter "You2K Now." You can visit his Web site at www.you2k.com. His Internet address is peter@peterkeen.com.

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Online MORTGAGE

Less than meets the eye

Mortgage Web sites are a great way to shop for loans. But once past the snazzy interfaces, you're caught in the old paper chase. Here's how some leading sites are trying to break free.

By Robert L. Scheier

What a Web Site Can (and Can't) Do

1. Shop for Rates

GRADE: B+

Can be done quickly and easily using automated search engines on Web sites. But automatic tools may not find the best rates for special cases, such as a second mortgage or a retiree with significant assets but no easy-to-calculate fixed monthly income.

2. Find an Actual Lender

GRADE: C-

Very hard to do because few Web sites have real-time access to lenders who can do an actual evaluation of your application and give you a legally binding preapproval. Many sites refer loan shoppers to overloaded service representatives or traditional brokers.

BUSINESS COVER STORY

hen Lakeland, Fla., retiree Gloria McCabe began searching the Web in September to refinance her home mortgage, she hoped she'd be able to compare rates, fill out her application, track its progress and receive her new loan by just pointing and clicking.

No such luck. Some loan sites turned her down flat because their electronic application forms insisted she list monthly income. "As a retiree, my income is whatever I choose to take out

that month [from investments], and I don't need much," McCabe says. Because "there was no place where I could tell them what my actual assets were, they would come back and say there were no loans available."

It was only when one site, LoanWeb in Canoga Park, Calif., referred McCabe to a real, live mortgage broker that she found the kind of deal that would work for her, a cost of funds index (COFI) loan, with an interest rate at a little over 5%.

Without the human touch, "I would still be up the creek," McCabe says. "He was willing to listen when I told him I had assets that weren't showing. Why didn't any of the other loan Web sites tell me anything about the COFI loan I'm getting?"

The Web is a good place to compare rates, fill out applications and figure out how much home you can afford. But to reach the important, legally binding milestones, such as getting a preapproval letter to wave in front of a seller or locking in a rate before it goes up, customers such as McCabe must still play phone, fax and mail tag with brokers or loan officers.

"Right now, you apply online and they print up your application, and in many cases it's fulfilled in the same manual way as if a mortgage broker had done it," says Jaime Punishill, an analyst at Forrester Research Inc. in Cambridge, Mass.

Only about 4% of the \$1.3 trillion in mortgages originated in the U.S. last year came through the Web, he says, which is "not even a rounding error on somebody's balance sheet."

"Only about 3% of all the mortgages we do on the Internet are done without any human interaction besides E-mail," says Seth Werner, president and CEO of First Mortgage Network Inc. in Plantation, Fla. "We find it easier to meet the needs of the customers by talking."

Common data standards and information systems will help the online mortgage business to grow. But as with online retailing and stock trading, the Web



will create new winners and losers. Those most likely to survive will be the ones who understand that as the Web turns products such as mortgages into commodities, great customer service becomes the crucial differentiator. That's where the mortgage industry is stuck now.

Wedded to Paper

Even if everyone in the industry were committed to going paperless, it wouldn't be an easy job. A real estate loan is a custom-tailored financial product in which exact specifications change based on everything from the credit score of the borrower to the location of the property.

"It wouldn't be unusual for a single loan product to have thousands of rules associated with how that loan might be priced," says Allan Redstone, CEO of GHR Systems Inc. in Wayne, Pa., which provides software and services for online lenders.

Mortgage brokers usually "don't have those rules in anything other than a hard-copy book," Redstone says. The broker must consult the book to verify that a customer qualifies for a specific loan. Then there are other costs that vary from case to case, such as lawyers' fees, court filing costs and local real-estate taxes.

Any online mortgage package must also take into account separate criteria set by Fannie Mae and Freddie Mac, the quasigovernmental "secondary market" organizations that buy mortgages in bulk and resell them to investors.

Mortgages flow through a highly fragmented distribution system, ranging from retail banks to mortgage brokers to mortgage banks — and each party relies on multiple sources of information. Most of that information, ranging from title reports to divorce decrees to appraisals, is paper-based and stored in nonstandard formats. The data goes to companies that are usually conservative, to say the least, when it comes to technology, says Janina Pawlowski, president of Palo Alto, Calif.-based E-Loan Inc., which has taught some technophobic lenders how to set up their first account with America Online Inc.

Even when Web-based lending works, a broker or loan officer has to step in whenever the applicant's situation doesn't fit predetermined criteria (such as McCabe's) or has more complicated needs (such as a poor credit history). Still, at more than \$1 trillion, the mortgage industry "would be a very large market for Web-based lenders to tackle," says Theodore Iacobuzio, an analyst at The Tower Group, a Needham, Mass., consulting group.

Following are some of the ways Web-based lenders are trying to overcome or work around the technical hurdles:

Online mortgages, page 54

3.

Submit Paperwork

GRADE: D+

Can't be done online because documents such as W-2s, tax returns, appraisals and inspections usually don't exist in digital form and must be faxed or mailed. Credit reports can usually be delivered electronically, but most lenders and regulators require signed authorization to do a credit check. Lack of digital signatures means most documents must be faxed or mailed.

4.

Resolve Problems/Verify Information

GRADE: D+

Online brokers lack automated systems to track status of missing or incomplete paperwork, such as applications, title searches and appraisals. When the inevitable problems arise, such as a credit agency sending the wrong information about your payment record, you have to find a real person to fix the problem.

MORE

Continued from page 53



Model 1: BECOME THE BROKER

than generating a profit, Berkley says.

QuickenMortgage claims to be "the most electronically integrated with the lenders," with the ability to electronically transmit information about applicants to lenders rather than having to reenter information from an online application. The lender must still, however, call the borrower to get additional information, paper documentation and send a written application for the applicant to sign.

It also claims to generate more traffic than other online mortgage sites, through alliances with portal sites such as AOL and Excite Inc. Approximately 5,000 customers per month submit loan information to the QuickenMortgage site, Berkley says, resulting in "more than several hundred and less than several thousand" actual mortgages per month.

Mountain View, Calif.-based Intuit won't say if QuickenMortgage is profitable, but it cited "operating expenditures to expand Internet business" as one reason it lost \$27 million in the fiscal quarter ended Oct. 31.

It also noted that Internet commerce still accounts for less than 10% of company revenue and that "potential Internet-related revenue and profits may be difficult to predict or achieve."

LITTLE-KNOWN IMX Exchange takes a different approach, betting that paperwork will keep the flesh-and-blood broker in business forever.

"When it comes to making sure all the i's are dotted and all of the t's are crossed, dealing with a broker is the best way to do it," IMX vice president Erin Esperanza insists.

IMX Inc. in San Ramon, Calif., runs the IMX Exchange, an intranet-based, continuous blind auction in which lenders anonymously post their best rates for loan applications posted by an approved list of brokers. The anonymity lets lenders quietly make special deals below

their published daily rates, dip their toes into a new geographic region or find customers to whom they must lend for regulatory reasons.

Because IMX works with more than 500 carefully screened brokerages and filters out multiple applications, it sharply reduces the "fallout" when a customer withdraws a lender's application because of a better deal elsewhere, Esperanza says.

Esperanza declined to say whether IMX, which went online in November 1997, is profitable or how many people it employs. Almost \$1 billion in mortgages has passed through the IMX Exchange, she says, but she wouldn't disclose the amount IMX is paid for its services, except to say it's lower than the fee charged by a traditional mortgage broker. "Whether or not IMX will be successful is a real question" because secondary buyers such as Fannie Mae may hesitate to buy mortgages resulting from blind bids, First Mortgage's Werner says. But because, at most, 30% of mortgages will likely be processed online by 2005, he says, good loan officers "aren't going to be replaced so quickly."



Model 2: BECOME THE BROKER AND BANKER

PALO-ALTO, CALIF.-BASED E-Loan does everything QuickenMortgage does and more: It can not only refer a customer to a lender, but can fund the loan through its own mortgage bank. This lets E-Loan Inc. make quicker decisions on applications but saddles it with more risk if the borrower defaults.

CEO Chris Larsen's plan is to replace either the mortgage broker or the loan officer at a bank with an automated workflow system which will handle everything from collecting information about a lender to coordinating the funding and closure of the loan. E-Loan will charge borrowers 5/8 of 1% of the loan amount to handle the work.

Some things are relatively easy to automate. E-Loan built a proprietary search engine that scours its database of 45,000 loans for those that meet a customer's criteria. Lenders can also automatically update their rates by E-mailing an Excel spreadsheet to E-Loan, and E-Loan had little trouble developing filters to reformat that rate data into E-Loan's Oracle 7.3 database.

But updating the complex rules that determine who qualifies for what loan, and at what price, is trickier. E-Loan employees manually reenter that data from three-ring binders, says E-Loan President Janina Pawlowski, a process that fortunately only happens once per quarter for most lenders. E-Loan must still pay workers to trade faxes, phone calls and mail with lenders, appraisers and title companies stuck in the paper age.

Like many online lenders, E-Loan is in an awkward place: It must provide top-notch service but hasn't yet automated the process enough to make money. The privately held E-Loan generates revenue at a \$10 million-per-year run rate, Larsen says, and last fall received \$25 million from investors. The company originated close to \$4 billion in loans last year but still isn't profitable.



Model 4: SELL TO THE BROKER- OR ANY- ONE ELSE

IN A GOLD RUSH, the fellow most likely to make money is the one selling shovels and food to the miners.

That's why First Mortgage Network Inc. does everything from lending money directly to consumers through its own Web site, to outsourcing the back-office operations of online brokers, to selling software to brokers and lenders.

The Plantation, Fla., firm doesn't disclose financials, citing a possible stock offering. But since its founding in 1993, its staff has grown to 425. In November it originated \$210 million in loans, \$80 million via the Web, Werner says.

"First Mortgage Network is in every piece of the pie," Punishill says, including running online mortgage sites for real-estate brokerages such as Prudential of Northern California and home builders such as Arvida Co. in Boca Raton, Fla. Such links are crucial to building volume, Punishill says, but will succeed only if Web-based players can "deliver the close through automated back-office systems." Punishill predicts common standards and systems — under heavy prodding from Fannie Mae and Freddie Mac — will enable truly paperless loans in 24 to 36 months.

At that point, the broker becomes important not to find the mortgage but for local advice and problem-solving, Punishill says, which could cut brokers' fees.

Look for the mortgage business, then, to evolve the way online stock trading has, with some of the biggest traditional players failing and middlemen scrambling for new roles. The lessons: Focus on automating your processes, and remember that service is everything. Just ask Gloria McCabe. ▀

5.

Check Status of Your Loan

GRADE: C

Some sites claim to let you view the status of your loan application online or to E-mail you updates. But follow-through is spotty and information can be out-of-date because the updates often are manually entered on the back end by overloaded service representatives.

6.

Get Funds; Close on Home

GRADE: F

Lenders and government agencies require physical signatures due to lack of a digital signature standard. Many lenders still require verbal or written confirmation before locking in or guaranteeing a loan rate. Lenders, lawyers and customers are used to closing on loans in person and exchanging physical documents. ▀

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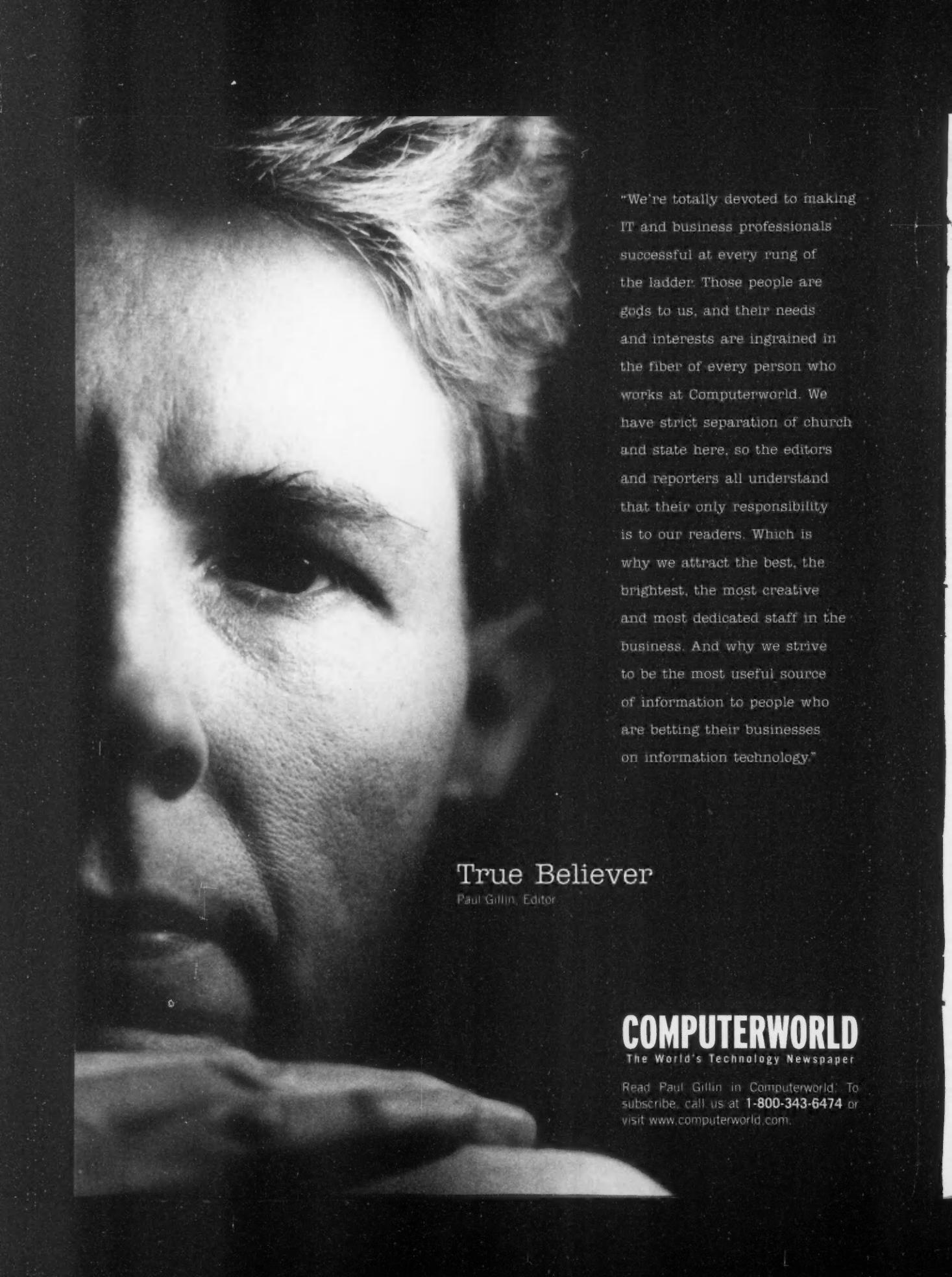
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PATHTS TO A BETTER DEAL



CHRIS ANTICKS

WHEN KEVIN MEYD WANTS TO BUY TECHNOLOGY FOR T. ROWE PRICE, HE LOOKS FOR AN AGGRESSIVE VENDOR THAT'S WILLING TO MAKE CONCESSIONS

Smart IT buyers know what buttons to push to get the best deals from vendors. Here are a few that get results By Deborah Radcliff

KEVIN MEYD knows how to shop. When he prepares to make a big technology purchase for his company, Baltimore-based mutual funds company T. Rowe Price Investment Services Inc., he looks for hungry vendors — those whose financial performances need a little boost.

"In one large software deal early last year, the vendor was really aggressive, which told me that I had some cards I could play," he says. "I took it well into the [fiscal] quarter to get them to make concessions."

Concessions aplenty. When the deal was wrapped up, he had negotiated a discount 50% off the list price and discounts on future purchases and maintenance.

In technology buying, it's all in how — and when — you ask. And though you don't always get what you negotiate for, if you're a smart buyer, you know what buttons to push to get the best deals.

Timing is everything, Meyd says. The best situation is when you have the luxury of time, and your vendor, needing to boost sales, is on a collision course with

its quarter- or year-end. That puts you in control and opens opportunities to negotiate just about anything.

Foremost, "don't pay before you use it," advises Greg Stevens, a technology negotiator in Richmond, Va., who works as an independent contractor at Fortune 500 companies. "Consider a large company purchasing an enterprise-wide software tool with a 12-to-18-month configuration, integration and rollout schedule. You should pay in installments over the rollout period to align costs with anticipated benefits."

Don't let the vendor treat the initial purchase as debt owed, but rather as a precommitment to deploy, Stevens continues. And don't pay maintenance on a product you have yet to deploy. Say a vendor offers an up-front discount of 25% on a 1,000-seat purchase. The annual maintenance charge is the standard 15% to 20%, with a 10% annual finance charge. You're lucky to break even.

Know What You Need

Before you select potential vendors, ask yourself what benefits you'd get from using the tech-

nology, advises Steven Cohen, president of Negotiations Skills Co. (www.negotiationsskills.com) in Prides Crossing, Mass. "Establish some criteria of a successful system," he suggests. And, once you answer the "why you need it" question, seek competitive bids. Meyd says, "If you tell a vendor he's the only one you're looking at, you've lost your negotiating position."

Then it's time to get the skinny on the contenders. Start with the Internet, Stevens suggests. Its vast resources — from press materials to Securities and Exchange Commission filings — can give you much information about financial performance, market projections and competition. Other sources of information include trade journals and market research firms. Also, check references, preferably among users in an industry similar to yours. Meyd suggests joining user groups and mailing lists to talk candidly with users about product performance.

When it's time to cut the deal, negotiators offer the following tips to strengthen your position:

- Think about buying from a vendor fighting to protect market share, says Dave Weidenfeld, senior counsel in charge of technology purchases at McDonald's Corp. in West Oak Brook, Ill. Although he says sticking with the big, reputable technology companies certainly reduces risk, Weidenfeld has bought from vendors trying to hold their positions amid increasing competition. He used that strategy to slash a \$900,000 product upgrade to \$350,000.
- Agree to be a reference site in

exchange for better pricing, support and additional consulting. "I've certainly seen discounts that exceed 40% off-list this way," Meyd says. "But it all depends on the timing, what the deal is and what the product is."

■ If you have the patience and technical skills, Meyd suggests you offer your company as a beta site for a new product. Yes, it's a hassle waiting for bug patches. But, Meyd says, "you could get involved in development and get the vendor to put in features you couldn't get from other vendors."

The most important element of any technology buy is overcoming the acrimony often associated with buy/sell relationships, says Robert Cawley, senior vice president of consulting at Meta Group Inc. in Stamford, Conn. "You need to align expectations on both sides of the table so it turns into a 'win-win.'"

The best way to tell if your negotiations are going well is to listen for "nos" from your vendor. If you don't hear any, it means you're not asking for enough, says Joe Auer, president of International Computer Negotiations Inc. (www.dobetterdeals.com) in Winter Park, Fla. The firm helps companies negotiate IT buying deals.

And keep alert, advises Al Hershey, partner and overseer of Ernst & Young LLP's internal information and technology services. "If the vendor gives you a concession here, he'll try to make it up somewhere else," he says.

Radcliff is a freelance writer in northern California. Her Internet address is DeRad@aol.com.

What to Say

A well-coordinated year 2000 communications plan can head off confusion today and lawsuits tomorrow

By Kathleen Melymuka

THE SMOKING GUN: It's every prosecutor's dream, every defense attorney's nightmare. It's the one thing you can't afford to have in your year 2000 arsenal.

There are all kinds of good reasons for developing a year 2000 communications program, but avoiding a lawsuit may be the best. Did someone overstate your year 2000 readiness? Did the board of directors get one message, customers another? If so, you could be in trouble come litigation time.

With controlled, clear and accurate year 2000 communications, there's no smoking gun, no inconsistency and less vulnerability. Inside and outside the company, there's less confusion and a clear message that the company is doing what should be done.

But it's a big job. Year 2000 communications com-

bine education, lobbying, public relations, marketing, logistics, crisis management and law. Doing it right requires at least a little know-how in each.

Control What's Said

Job one is to control what's said. "We don't want people randomly talking," says Dennis Grummer, year 2000 project manager at Sears, Roebuck and Co. in Hoffman Estates, Ill. "All inquiries are ultimately referred to me."

Rules such as that need to be hammered home as part of the internal year 2000 awareness program, which may include presentations and meetings, internal publications, bulletin boards, E-mail, employee hot lines, poster campaigns, an intranet and payroll stuffers. PECO Energy Co. in Philadelphia developed a theme and logo to increase visibility. BankBoston Corp. produced a seven-minute video that was seen by everyone in the company.

Know Your Audience

Different people have different year 2000 questions, observes John Aherne, director of communications for the year 2000 program at General Motors Corp. in Detroit. A car owner, for example, wants to know if internal microchips will cause problems, if dealers' diagnostic equipment will work, if systems that track warranty and financing information will run. An investment broker, on the other hand, wants details on GM's year 2000 organization, process, schedule, executive support, and supplier and plant readiness. "And the list goes on," Aherne says.

He worked with business and legal people to craft about 15 different written responses for various constituencies. The letters address the concerns of suppliers, dealers, vehicle owners, GM employees and retirees. They also discuss GM's year 2000 program, including billing systems, computers and networks, facilities, buildings and manufacturing.

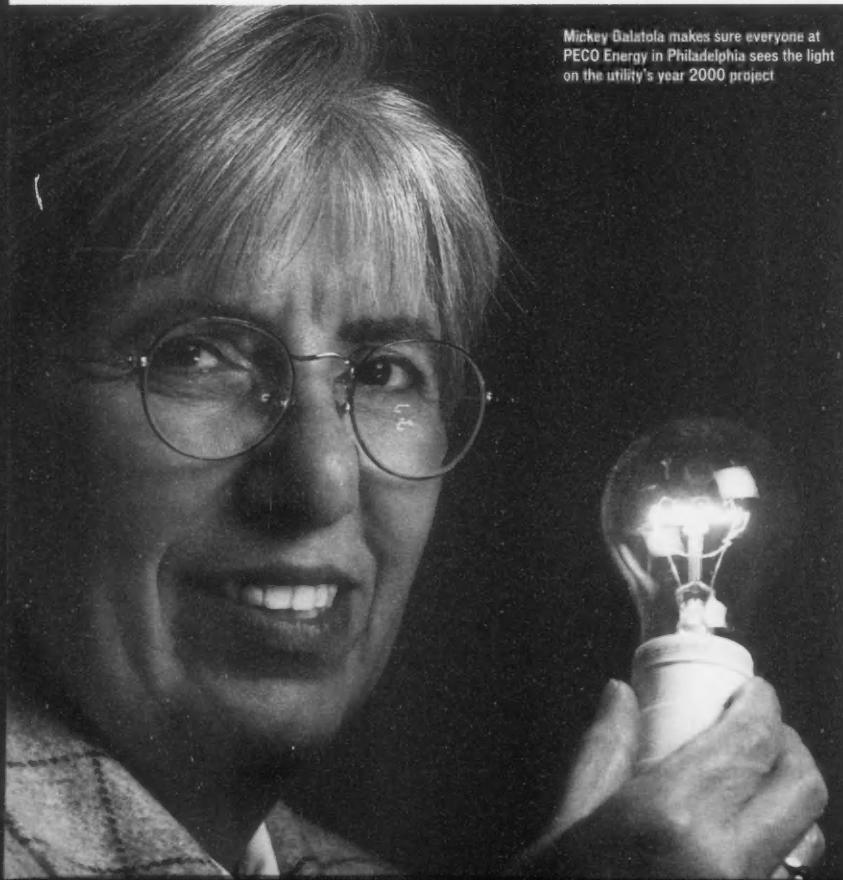
Andria Bayne, year 2000 communications manager at Harvard Pilgrim Health Care, a health maintenance organization in Brookline, Mass., has taken a different approach, using one standard, comprehensive reply. Either way, written responses ensure a consistent message.

But sometimes a central approach isn't practical, such as when a customer quizzes a sales representative about year 2000 status.

"We had to think about empowering the business partners to deal with customers," says Steve McManus, year 2000 communications director at BankBoston. "So we've given them the information to say, 'This is what the bank's doing about Y2K. Now let's get back to the discussion.'"

Businesspeople at BankBoston such as sales representatives, loan officers and relationship managers get ongoing training that includes "do's and don'ts" for year 2000. (Do assure customers that the bank has been working on the problem for years and is doing everything in its control to minimize disruption to

Mickey Dalatola makes sure everyone at PECO Energy in Philadelphia sees the light on the utility's year 2000 project



BUSINESS

About Y2K

the customer base. Don't give a guarantee that the bank will be year 2000-ready.)

Communications need to be tailored for different internal audiences as well. At GM, for example, the board of directors gets updates on project finances and schedules, including any gaps and how they intend to close them. Rank-and-file employees get project overviews and information about their PCs and business systems that concern them, such as payroll. "Some concerns are personal, but they also want a comfort level that the company is doing what it's supposed to be doing," Aherne says.

Good communications can also help keep the year 2000 team in sync. BPAmoco has held five internal year 2000 conferences where Y2K corporate staff and project managers shared information and processes. At PECO, year 2000 project managers keep in touch through daily meetings; once a week, businesspeople are invited. There's also a year 2000 database that captures data from each year 2000 project. "We have a global PECO view," says Mickey Galatola, director of PECO's year 2000 project. "It's a management tool and a communications tool."

Get It Right

Job two is accuracy. "We need to make sure that anything I talk about is the same as what has been reported to the [Securities and Exchange Commission] and the same as what's going on in real life," Aherne says.

He's dead right. "One of the strongest avenues for lawsuits will be misrepresentation, where companies represented themselves as more compliant than they were or taking more steps than they actually were," says Diana McKenzie, a partner at the law firm of Gordon & Glickson PC in Chicago. "It's a tricky line to know how much to say."

This is where your legal office can help (see story at right).

One way to ensure accuracy and control is to push

information out before questions come in. BankBoston, for example, has been negotiating a "paper blizzard" of year 2000 surveys from its customers, McManus says. So he's chosen the most commonly asked questions and posted answers on the bank's Web site (www.bankboston.com).

Companies are also getting public relations value out of their year 2000 progress through customer newsletters, articles in publications, bill stuffers and Web pages. Some make a point of speaking at year 2000 conferences.

PECO has been sponsoring presentations, workshops and business forums, where it offers customers support, guidance and contingency planning guidelines. "We're not going to do their work for them, but we try to be supportive based on our experience," Galatola says.

PECO has been finding a real hunger for straight talk on year 2000. Prior to a recent presentation to select clients, for example, the clients asked if their own clients could also attend. Attendance tripled.

Event Horizon

The biggest challenge is still ahead. "Communications are going to play a critical role in event planning," McManus says, referring to the time immediately around the date change. "We'll have command centers answering questions like, 'Who do I call if there is a problem?' 'How do I get in touch with that person?' 'What are everyone's responsibilities?' I'll be working on what we're going to tell the public: If this goes wrong, this is the message."

If that goes wrong, this is the message." Meanwhile, he says, "I need to communicate progress. I look at this as a marketing program. The message is confidence. You have to get the message out."

Melymuka is Computerworld's senior editor, management. Her E-mail address is kathleen_melymuka@cw.com.



DAVID DENDTRE

Taking It Personally

Year 2000 isn't just a technology and business problem; it's a social problem.

Alliant Energy Corp. in Madison, Wis., has recognized that. Its Web site (www.alliant-energy.com) gives customers candid information about what year 2000 could mean to them — including the possibility of power outages, food shortages and public safety problems — and how they should prepare for it.

"We thought, in the absence of really candid information, it's not enough to tell people, 'Don't worry,'" says Pamela Wegner, the executive vice president who oversees the year 2000 project. "So we took the position that it was in our collective community interest to tell people everything we understood and engage them in helping us bring this to the attention of other people and take appropriate steps to prepare themselves."

The site advises people to quiz financial institutions, insurance, medical and public safety providers; and utilities on their readiness, obtain updated paper copies of important documents and develop personal contingency plans. The power company even discusses what to look for in a backup generator.

"We've had enormously positive response," Wegner reports, "and we encourage people to plagiarize liberally from our Web site. Our view is, if we don't share information, we can't be successful. We sink or swim together."

— Kathleen Melymuka

The Y2K Talk: Do's and Don'ts

Sam Byassee, a partner at the law firm of Smith Helms Mullis & Moore LLP, in Raleigh, N.C., offers some pointers for year 2000 communications:

► **DON'T** assume that you must use the questionnaire form that an organization asks you to answer. DO provide information that you think will be useful and DO offer to work with the other party to address any concerns specific to your company. That helps to show due diligence without wasting your time on minutiae that doesn't apply.

► **DON'T** sign a questionnaire that says you're certifying anything, indemnifying the other company or providing a warranty. DO provide the appropriate information and send it back with a letter declining to accept the additional risk requested in the certification or warranty.

► **DON'T** assume that if you're ready internally for year 2000, you won't have any problems.

► **DON'T** allow any overoptimism or overconfidence to creep into your response.

► **DON'T** give firm projections even if your project is on schedule.

► **DON'T** give an absolute deadline for when you'll be ready. "It's the difference between 'We will be ready' and 'We now expect to be ready,'" Byassee notes.

► **DON'T** provide more information than requested, even if you're proud of the work you've accomplished. "If you say 10 things, you have 10 chances of something going wrong," Byassee says. "If you say 20 things, you have 20 chances."

► **DO** be responsive. Trying to stonewall or evade inquiries will raise a red flag and focus more attention on your company.

► **DO** explain that the information being provided may change based on changes in future circumstances.

► **DO** include a notice on written material that it's a "year 2000 readiness disclosure" pursuant to the federal Year 2000 Information and Readiness Disclosure Act of 1998. Statements with the label can't be used as evidence in any lawsuit.

► **DO** be truthful and as accurate as possible.

► **DO** brief people who may be asked year 2000 questions on what the company is doing and what the appropriate type of response is.

► **DO** have those people add that they aren't directly involved in the project and that for more detailed information, the questioner should contact the project office.

THE TOP 10



1 BOSTON

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Median house cost: \$204,331

TOP IT JOBS AND SALARIES: Director IS/MIS: \$75,000; programmer/analyst: \$54,000; PC technical support specialist: \$53,750.

EXCEPT PERHAPS for a World Series win, IT professionals can have it all in Boston. They can work in the IT industry or in an IT department, as a consultant or as an employee, for a small, entrepreneurial startup or a large, established corporation. And outside the office is a city full of history and culture to explore.

"You have the best of both worlds here," says Paul Lesser, director of technology staffing at Fidelity Investments, a financial services firm.

He notes that the area's plethora of colleges and universities, such as MIT, Harvard, Boston University and others, and the proximity of the Route 128 technology loop, have created a wide range of IT opportunities.

Demand remains high for Unix systems administrators, firewall specialists, applications developers who know C++ and Java, and networking specialists, Lesser says.

The area's top industries are financial services and banking, software development, telecommunications equipment manufacturing, hardware manufacturing, insurance, retail and utilities.



2 CHICAGO

Metro population: 8.6 million
Median house cost: \$169,200

TOP IT JOBS AND SALARIES: project manager/systems and programming: \$65,000 to \$85,000; senior systems analysts: \$55,000 to \$75,000; computer operators: \$30,000 to \$40,000; PC tech support: \$55,000 to \$75,000.

THE WINTER may be cold, but the IT job market is hot in Chicago.

The city's industry boasts a mix of major corporations and prospering high-tech companies.

Paul Lemmerise, executive vice president and CIO at Truserve Corp., the wholesale distribution cooperative for the hardware industry, says IT help-wanted ads have doubled in the past six months.

Work runs the gamut, from the Internet and electronic-commerce arenas to traditional IT development.

Lemmerise says C++ and Java programmers and people who can set up Web pages and write transactions and programs to do business on the Internet are scooped up in a heartbeat.

On the other hand, "there are no consulting or contract programming companies with people available to work on [new] Y2K work, so if you haven't staffed up for that, you will have to go forward into 1999 using existing resources," he says.



3 ATLANTA

Metro population: 3.5 million
Median house cost: \$106,800

TOP IT JOBS AND SALARIES: project manager/systems and programming: \$60,000 to \$70,000; Senior systems programmers: \$50,000 to \$60,000; senior systems analysts: \$75,000 or \$80,000.

THE FULL MOON is rising over Silicon Crescent, the new moniker for the flourishing information technology industry in Atlanta.

It's booming with industry, growth and jobs, jobs, jobs.

Many large-scale organizations call Atlanta home, including The Home Depot Inc., Coca Cola Co., Delta Air Lines Inc. and United Parcel Service of America Inc.

Technical support, help desk services and response centers are big here, and there are several large consulting firms.

All that enterprise is creating a lot of demand for systems integrators and systems consultants, client/server software developers and Internet and networking experts, according to Bob Branford, director of MIS at Printpack Inc., which manufactures flexible packages.

Also moving in are people from everywhere but Georgia. That outside influx is transforming the city into a cosmopolitan, friendly and open business area, says Duane Hill, technical recruiter at Bass Hotels & Resorts.

Also moving in are people from everywhere but Georgia. That outside influx is transforming the city into a cosmopolitan, friendly and open business area, says Duane Hill, technical recruiter at Bass Hotels & Resorts.



4 WASHINGTON

Metro population: 7.1 million
Median house cost: \$166,300

TOP IT JOBS AND SALARIES: project managers: up to \$90,000; senior systems analysts and senior systems programmers: \$70,000; PC tech support specialists: \$35,000 to \$40,000.

NOT ALL THE ACTIVITY in Washington is political — it's also technological.

Web development and electronic commerce have taken hold and created demand for Internet-based skills. But that isn't all.

IT consulting is big business here — from small boutique shops to PricewaterhouseCoopers — creating a demand for software engineers and applications developers, according to Tom Carter, manager of Washington operations at Quest Systems, a recruitment firm in Bethesda, Md.

"Organizations here are investing so much in technology that the demand for IT people is tremendous," says Amtrak CIO Stephen Roberts. Roberts is employing people with talents ranging from C++ programming to Cobol programming.

Roberts recommends that technical skills be tempered with business know-how.

"I'm looking for people who can solve my business problems with their technical skills," he says.



5 NEW YORK

Metro population: 19.5 million
Median price for two-bedroom home: \$155,000

TOP IT JOBS AND SALARIES: project manager/systems and programming: \$85,000 to \$105,000; database administrator/developers: \$100,000 to \$130,000; programmer/analysts: \$50,000 to \$75,000; senior systems analysts: \$70,000 to \$85,000.

THE BIG APPLE's overall job market has gone a bit mushy recently, but the IT outlook remains as bright and vibrant as Times Square.

The financial services sector has had its share of mergers and acquisitions, and the roller-coaster stock market has resulted in some layoffs. But IT professionals have managed to avoid the ax so far, given the demands of year 2000 and euro conversions and the explosion of electronic commerce, online trading and home banking. Database and Net skills are particularly hot. Entertainment and media companies, pharmaceuticals firms and the new media marketplace, dubbed Silicon Alley, are also keeping demand for IT professionals high in spite of softening of the overall market, says Scott Dinsdale, senior vice president and CIO at BMG Entertainment.

Salaries are high, but so are housing costs. If you just adore a penthouse view, expect to pay for it.



6 SAN FRANCISCO

Metro population: **6.6 million**
Median price for two-bedroom home:
\$325,000

TOP IT JOBS AND SALARIES: network administrator/analyst: **\$40,000** to **\$60,000**; project manager, systems and programming: **\$70,000** to **\$120,000**; senior programmer/analyst: **\$60,000** to **\$85,000**; programmer/analyst: **\$45,000** to **\$65,000**.

IT PROFESSIONALS don't have to leave their hearts in San Francisco.

With the ample number of high-tech, multimedia, retail and financial services firms in the Bay Area, there's no reason to leave.

And most transplants to the area say it's love at first sight. "I've worked on the East Coast, in the Midwest and here, and it's definitely more laid-back here," says Lauri Jenson, manager of technical recruiting at Wells Fargo Bank. "The environment is professional, but it's more 'user-friendly.'"

Employers also are hip to a balance of work and family life, allowing telecommuting and flex time and providing on-site day care, Jenson says.

Wells Fargo (which announced a merger with Northwest Bank Nov. 2) and other area employers favor using the Internet to find candidates, so get your résumé into HTML format, Jenson advises.



7 SEATTLE

Metro population: **3.3 million**
Median housing price: **\$171,300**

TOP IT JOBS AND SALARIES: network administrator/analyst: **\$60,000** to **\$80,000**; project manager, systems and programming: **\$65,000** to **\$75,000**; senior systems programmer: **\$70,000** to **\$80,000** (for ERP implementations) or **\$65,000** to **\$80,000** (for mainframe programmers); PC technical support specialist: **\$40,000** to **\$55,000**.

IT'S RAINING IT jobs in Seattle, and IT professionals with an umbrella of applications development experience will find their opportunities are anything but all washed up.

Despite recent layoffs at The Boeing Co., one of the area's major employers, the market remains strong, says John Kirchgessner, director of IT systems recruiting at Airborne Express Co., and Lisa Reinitz, manager of the group.

And the situation shows few signs of abatement. Below-average unemployment coupled with substantial projected job growth of 8.7% through 2002 will keep the market tight for the next few years.

Companies need professionals who can work in "everything from Visual Basic to Unix to C to Java to Cobol," Reinitz says. Even the Cobol skills shortage is severe.



8 LAS VEGAS

Metro population: **1.2 million**
Median price for two-bedroom home:
\$129,000

TOP IT JOBS AND SALARIES: project manager, systems and programming: **\$60,000** to **\$70,000**; senior systems analyst: **\$50,000** to **\$60,000**; programmer/analyst: **\$50,000**; network administrator/analyst: **\$50,000** to **\$65,000**.

THE IT JOB market is swinging in Las Vegas, baby. Roll the IT dice here, and it's lucky sevens every time.

Gaming and government are the high rollers, and demand outweighs supply — especially for the type of IT skills required along the Strip, says Joe Gumataotao, director of applications management at Caesar's World Inc., which owns Caesar's Palace.

Casinos are big AS/400 users but also employ other platforms such as NetWare, Windows NT and Unix. Property management systems and transaction processing systems such as point-of-sale, instant cash and instant credit also are used.

IT jobs in gaming require a certain type.

"Go-getters who are willing to not just do the work but who are able to do R&D and be innovative; whoever can manipulate the data and crunch the numbers the best," Gumataotao says.



9 ST. LOUIS

Metro population: **2.5 million**
Median house cost: **\$96,000**

TOP IT JOBS AND SALARIES: project manager/systems and programming: **\$50,000** to **\$75,000**; senior systems analyst: **\$40,000** to **\$65,000**; senior systems programmers: **\$60,000**; senior programmer/analysts: **\$50,000** to **\$65,000**.

MEET ME IN St. Louis, where the IT professionals may not be singing, but they are signing — on to a high-demand but conservative job market.

The challenge in that growth economy is to fill vacancies with the right people and the right skills, says Jeff Chasney, CIO at Clark Refining and Marketing Inc., a petroleum refining and sales organization.

The hot skills are clear: The entire Web application arena — Internet, intranet, or "othernet" (all the electronic-commerce and extranet activity in the Web world) — is ripe for people who really know what they are doing and can offer consulting and advice to the companies in this somewhat behind-the-bleeding-edge town. "You aren't going to find

companies in the pioneer stage on the Internet here. Same thing with three-tier client/server development; companies here are just embarking on that," Chasney says.



10 AUSTIN, TEXAS

Metro population: **1 million**
Median house cost: **\$118,200**

TOP IT JOBS AND SALARIES: project manager/systems and programming: **\$65,000**; senior systems analyst: **\$65,000**; senior systems programmers: **\$60,000**; senior programmer/analysts: **\$60,000**.

THERE ARE JUST TWO words to describe the Austin IT job market — signing bonuses.

With more established companies such as Dell Computer Corp. and Samsung Corp.; chip manufacturers such as Advanced Micro Devices Inc. and Texas Instruments Inc.; and start-up firms, the city has made a name for itself in competitive hiring practices.

"It is getting more expensive to hire people all the time," says Carl Morris, president of WholeFoods.com, a subsidiary of Whole Foods Market Inc. His own career is indicative of the changes in the Austin job market — he used to be the CIO of Whole Foods Inc.

On the more traditional side, there's still a pressing need for the IT generalist, as well as computer engineers, software engineers, people with mainframe skills and Cobol programmers for year 2000 work, according to Bill Grabo, director of automated information services at the Texas Higher Education Coordinating Board. ▀

SAN FRANCISCO CONVENTION & VISITORS BUREAU PHOTO BY DAVID MELTZER

SEATTLE CONVENTION & VISITORS BUREAU PHOTO BY DAVID MELTZER

LAS VEGAS MANDARIN PHOTO BY DAVID MELTZER

ST. LOUIS CONVENTION & VISITORS BUREAU PHOTO BY DAVID MELTZER

AUSTIN TEXAS CHAMBERS OF COMMERCE PHOTO BY DAVID MELTZER

IT JOB MARKETS

Methodology: Rankings of the top 10 IT job markets are based on hiring projections from Computerworld's Annual Hiring Forecast, combined with skills hiring projections for 1999 and salary forecasts for 1999. These surveys represent IT workforce projections from approximately 2,000 IT hiring managers, from August to December 1998.

Goff is a freelance writer in New York. She can be contacted at lgoff@ix.netcom.com. Leinfuss is a freelance writer in Sarasota, Fla.

Dear Career Adviser:

I'm a student pursuing an MIS degree with a focus in health care consulting. Do you have any advice or information that would be of help to me? — LYNN IN LANGFORD

Dear Lynn:

Skills in health care information systems or medical informatics are in high demand because of the convergence of several factors: an emphasis on cost-cutting, plus technology and biotech advances. Essentially, the field is booming, with lots of jobs available. To give you an idea of the size of the field, consider all the applications of the technology used in medical diagnostics, such as compressing radiology films and shipping them over phone lines, designing Web sites for patient care and education, accessing huge patient medical records databases, and even the more traditional large-system consulting and implementation used in management of national HMOs and large medical complexes.

Philip Lohman, director of First Consulting Group in Long Beach, Calif., says "people get started in IT in health care the same way they do in other industries." If you do that, he says, "you will move up faster with a four-year computer science or [electrical engineering] degree." Other people may start in patient care or clinical areas — or

even accounting or finance — and then shift focus when they get involved in an IT planning or implementation project. Check out <http://informatics.ucdmc.ucdavis.edu> (click on "educational opportunities" for programs across the U.S.). People who work in health care systems understand technology and also tend to be people-oriented.

Dear Career Adviser:

I recently started a systems analysis position at a company where I will be developing online analytical processing (OLAP) Web-based reports and applications for a government agency using IBM's Focus Six and WebFocus by Information Builders. I'm trying to determine if OLAP and data warehousing are good areas to get in to for the future. What about using the Internet for database access, reports and applications? Will products like Focus Six and WebFocus launch my information technology career into the next millennium, or are they too specialized? — FOCUSED ON OLAP

Dear Focused:

Many savvy headhunters

agree with David Hayes, president of Boston-based Hire-Minds, who says, "OLAP is a niche field which is definitely growing, especially as we see major companies such as Microsoft with its Pluto product entering into it." And corporate intranets are being used more to access data warehouses, a trend that will continue as the new technology improves. And both Hayes and Dru Lesnick, director of network operations at Data Processing Independent Consultant's Exchange, a Web site that specializes in computer-related jobs, recommend combining OLAP and data warehousing with Web integration to create great new opportunities. But beware: OLAP Report co-author Nigel Pendse (www.olapreport.com) says Focus is old-fashioned technology and therefore



FRAN QUITTEL is an expert in high-tech careers and recruitment. She is the creator of The FirePower Career Forum on The Microsoft Network and of the Web sites [www.careerbabe.com](http://careerbabe.com) and www.yourcareer.com, which feature her tips and advice for job seekers and employers, respectively. Send questions to her at www.computerworld.com/career_adviser.

Dear Career Adviser:

I'm an IT professional with 20 years of experience. Originally from Odessa, Ukraine, I am now employed in the U.S. and have been living in Ohio since May 1, 1998, when I had a J-1 visa. My employer petitioned for my H-1B visa, which I received on Oct. 1, 1998. This visa expires June 1, 2001. However, I am not being paid. Must the company that hired me (the H-1B petitioner) pay me? What recourse do I have? Can I change employers? I am not certain where to go or what to do. I want to collect my October-through-December wages. — OUT OF MONEY IN OHIO

Dear Ohio:

According to immigration attorney Charles J. Favata in White Plains, N.Y., although your employer is a contract staffing company, it still must provide a specific

more likely to lead to a dead-end career maintaining wonky reporting systems rather than the latest technology. For more information on data warehousing, check out www.datawarehousing.com/newsgroups.htm and the list server at www.datawarehousing.com/list.as. Neither is for recruiters or headhunters, says Paul Marangoni at datamirror.com.

job for you and pay you at least 95% of the prevailing wage to obtain your H-1B visa. If you want to change employers, you need to find another to sponsor you. You might wish to consult an attorney, who you may find by contacting the American Bar Association at (800) 285-2221 (www.ab.org) or by looking in your phone directory for the state or county bar association listing. For Cleveland, try the Bar Association Lawyer Referral Service at (216) 696-3532.

Second, to collect back pay, contact your state's labor commissioner or equivalent. To find your state's labor commissioner, go to Ask-Jeves, www.askjeves.com or Hotbot, www.hotbot.com.

For example, in San Francisco, you would contact the Labor Commissioner of the State of California, Department of Industrial Relations, Division of Labor Standards Enforcement at (415) 557-7200.

For Ohio, if your employer grosses less than \$500,000 annually, call the Wage and Hour Division at (614) 644-2450.

If your employer grosses more than \$500,000 annually, you should call the state labor department's Federal Wage and Hour Division at (614) 469-5677.

On the Web, check out www.immigration.com, which also maintains FAQ lists for alt.uscis.us and misc.immigration.usa. Usenet newsgroups. (The FAQ is at rtfm.mit.edu.) Attorney Rajiv S. Khanna, who hosts the FAQ, cautions that your employer might have to pay fines or penalties, but, realistically, you probably won't receive a dime. ▀

WORKSTYLE BRIEFS

Advice

GETTING A GOOD START

So it's 1999 and you have a yen to start the year off right. What should you do? First, try thinking positively, advises Richard Wessler, a New York psychotherapist and professor of psychology at Pace University in Pleasantville, N.Y. You'll improve your chances of following through on your plans and other resolutions.

Then, try to get along with coworkers or those you supervise, and make them feel appreciated.

Finally, try something new, such as rearranging desk toys or engaging in new activities during breaks.

The end result? "People can expect to see that they will be able to make their plans come about more effectively, they will find they are refreshed, more enthusiastic, and probably will be more productive," said Wessler, who gleaned his tips from colleagues and patients during the past 30 years. "These ideas are not only good for the workplace, but they work in the family, too," he added.

Travel

WHAT? CHECK MY GARMENT BAG!

Rules governing what travelers can carry on to airplanes are stricter, and items such as garment bags often aren't making the cut, according to travelers and consumer experts interviewed by *The Wall Street Journal*.

Other findings: dimensions for acceptable "roller bags" have shrunk (to 9- by 14- by 22-in. in some cases), and anything from a laptop to a camera, once freebies, now often count toward your carry-on total (which is usually just two items).

Where should you earn frequent-

flier miles if you don't travel light? See the chart at right.

Benefits

OFFERING INSURANCE 'PARITY'

Three computer firms were among those honored last year for providing mental health insurance benefits equal to regular health care benefits. Compaq Computer Corp., Sun Microsystems Inc. and Texas Instruments Inc. joined EEX Corp., Exxon Corp., The Lubrizol Corp., Pitney Bowes Inc. and Prime Tanning Corp. in winning the Leadership in Business award given by the National Alliance for the Mentally Ill.

Carry-on Chaos

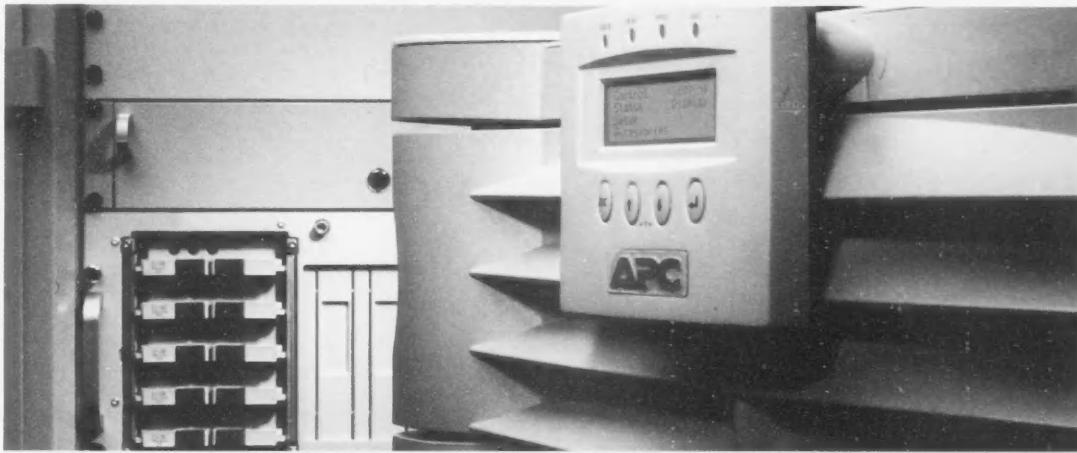
How strictly do airlines enforce carry-on luggage policies?

| AIRLINE | RATING |
|-------------|--------|
| United | **** |
| Delta | **** |
| TWA | *** |
| Southwest | *** |
| Northwest | *** |
| American | *** |
| US Airways | ** |
| Continental | * |

**** Toughest enforcement
*** Less hard-nosed
** Fairly lax
* Easiest

SOURCE: THE WALL STREET JOURNAL.
BASED ON INTERVIEWS WITH FLIERS AND CONSUMER EXPERTS

Is your high-availability network suffering from a low-availability legacy?



Introducing New Symmetra™ Power Array™ from APC.



If you've ever installed a 6-20kVA, non-redundant, legacy UPS system in a datacenter, you know the challenges: installation is a struggle, maintenance is a challenge, power upgrades are unheard of, and hardware tends to be unreliable. In fact, most legacy UPSs were designed for electrical and manufacturing applications and not with the needs of today's sensitive datacenters in mind. Worst of all, with a single point of failure, the legacy system is all too interruptible.

With power problems causing nearly half of all network downtime, the fastest and easiest way to increase network availability is to increase power availability. Now, APC's Symmetra™ Power Array™, a revolutionary power protection system, provides the high availability, flexibility, reliability, ease of installation and simple upkeep you need - all without breaking your back or the bank. Best of all, Power Array redundancy and manageability deliver uninterrupted peace of mind.

Installing or reconfiguring your modular Power Array couldn't be any simpler.



N+1 Redundancy: Symmetra Power Modules share the attached load evenly. If one module is removed or fails, the other modules seamlessly and instantaneously pick up the rest of the load. N+1 redundancy is used today in disk arrays (RAID), in processor power supplies, and in processors themselves. Symmetra Power Array brings redundancy to server power protection for the first time.

Scalable Power: Symmetra Power Array can be configured for 4-16kVA, enough for mid-sized computer rooms. Incremental 4kVA Power Modules expand UPS voltage load capacity to match datacenter demands.

Scalable Runtime: Additional Battery Modules, which may be shifted from one Power Array to another, or added in Extended-run Battery Frames, can provide virtually unlimited runtime. If you need to solve the problem of network downtime once and for all, install a Power Array with redundancy and fault-tolerance to match your server and storage. Call APC today for your FREE Enterprise Solutions Kit.

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Add Capacity/Runtime

Protect your investment with redundant, modular power modules: Scalable kVA and runtime ensure that Symmetra will meet your power needs now and in the future.

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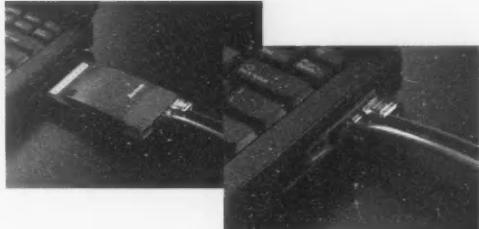


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TECHNOLOGY

APPLE'S APP SERVER DARE

WebObjects, the application server Apple scooped up when it acquired Next, gets solid marks from analysts and customers for its data access capabilities and object framework. But Apple's slow embrace of Enterprise JavaBeans has slowed WebObjects' acceptance. ▶ 74

SOFTWARE SIFTS THE NET

Text-mapping software helps users parse and manage Internet and intranet info. If your company has a lot of info-swamped knowledge workers, here are some packages that are worth a look. ▶ 76

NEW XEON SERVERS

Intel's release of the Pentium II Xeon has unleashed a batch of new servers designed to boost the performance of high-end Windows NT applications. ▶ 76

GIGABIT GROWTH SPURT?

Plummeting switch prices and an insatiable need for bandwidth should make 1999 a banner year for Gigabit Ethernet. Many companies are already using the 1G bit/sec. technology to replace congested backbone networks. And with some analysts predicting per-port prices to fall from today's \$1,500 to perhaps \$700 this year, more growth is in sight. ▶ 80

YOUR OWN PERSONAL Y2K

Sure, you're patching together your millennium-bug fix — but are you planning for a future in which sheer app development time is more important than a great system? Computerworld columnist Frank Hayes says that if you're designing for long life and future capacity, you're missing the point. ▶ 82

MORE BETTER MESSAGING

For years, message-oriented middleware has let applications carry on simple chats. Now Delta Air Lines is hoping its dedicated message processors will elevate the conversation. The airline is using IBM's MQSeries to link an unusual variety of applications, databases and translation software. ▶ 84

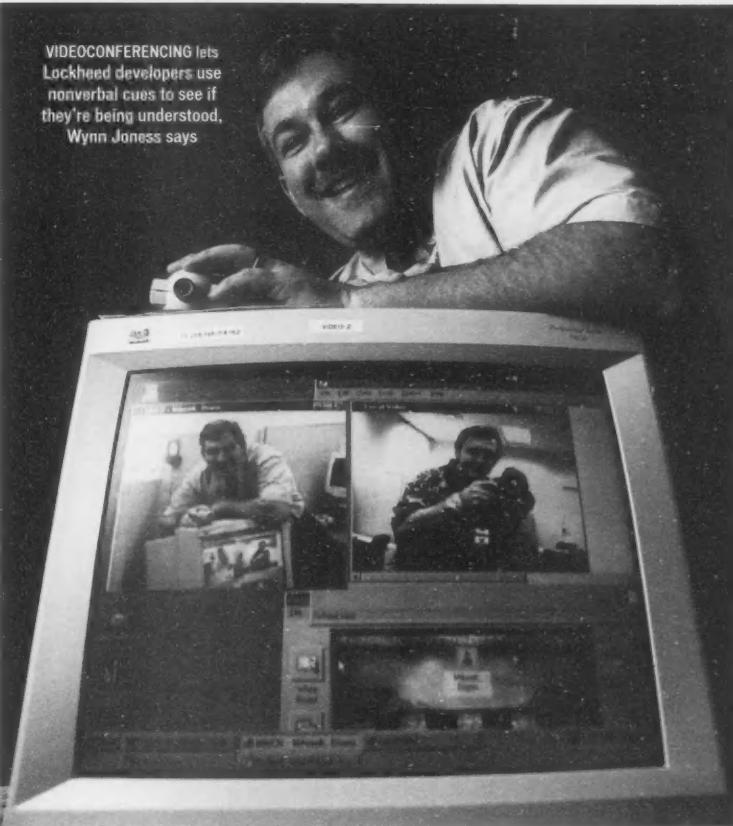
INTEL INSIDE?

A U.K. professor recently got the first known microprocessor implant. He used the chip to open doors, flip on his PC and draw him a bath. It may sound like a cheesy sci-fi flick, but practical applications are closer than you think. ▶ 89

MORE

| | |
|--------------------|----|
| Software | 74 |
| Hardware | 76 |
| Networks | 80 |
| Flashback | 88 |
| Exec Tech | 95 |
| QuickStudy | 96 |
| Skills Scope | 97 |

VIDEOCONFERENCING lets Lockheed developers use nonverbal cues to see if they're being understood.
Wynn Jones says



DANNY LINDNER

WIRED FOR THE MEETING

SURE, IT CAN SAVE you the price of an airline ticket. But experienced customers say the real benefits of desktop videoconferencing are convenience and the ability to read body language. In *Field Report*, five customers describe why they chose their videoconferencing vendors and how those choices are working out.

91



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APPLE APP SERVER SOLID, BUT LAGS JAVA SUPPORT

Users like strong object framework, data access capabilities

BY CAROL SLIWA

APPLE COMPUTER Inc. got a jump in the application server market two years ago when it acquired Steve Jobs' Next Software Inc.

Next's WebObjects applica-

tion server was one of the earliest entrants in what later became a hot and crowded market.

Since its purchase by Apple, WebObjects hasn't generated many headlines. But it should be considered by customers looking for tools to build and maintain applications that give Web clients access to legacy data,

One of the most complete products on the market," said Garone, citing its support for a broad range of network protocols, languages and Web standards.

He also cited its "superior" capabilities for creating object-oriented applications, which can be easier to maintain than those written in procedural code.

And though WebObjects is an Apple product, it has long run on Windows NT and Unix and only next month will be bundled with Apple's own Mac OS X Servers.

Pros and Cons

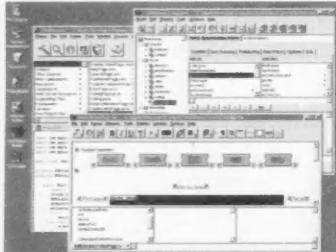
Users must weigh those strengths, however, against the fact that Apple has been slow to adopt industry standards such as Java and Enter-

prise JavaBeans.

One of the product's main selling points has been the rich, proprietary interfaces that let developers connect to a wide range of data sources more easily than if they wrote the code themselves.

Martin Marietta Materials Inc., for instance, wants to make all company information accessible via its intranet. Some of that information is tied up in mainframes, and programmers are tied up with year 2000 projects.

"Using WebObjects, we won't need lots of specialized database development," said Barry Starrfield, webmaster at the Raleigh, N.C.-based rock and chemical supplier. Instead,



The WebObjects application server will be bundled with the Mac OS X Server next month

his Web developers simply write business objects that are automatically fed information by the WebObjects framework, which communicates with the data sources via adapters.

A key distinguishing feature in the WebObjects product is its enterprise object framework that lets developers create object-oriented applications in building-block fashion and reuse code more easily.

"By using objects, I can centralize the location where changes are made," said David Brown, a Web infrastructure developer at the Mayo Foundation in Rochester, Minn.

"It's easy to extend the main application, because [any] subapplications make use of the existing [WebObjects] framework," he said.

But if a company wants to reuse code written to work with other application servers, there's no easy path. ▀

Sifting the Wheat from the Chaff - Online

Packages turn Web data into knowledge

BY ROBERTA FUSARO

Too much text on the Internet plus too many confused end users has given rise to knowledge management — the harnessing of external and internal information to improve business processes.

Text-mapping technologies are becoming part of that equation, users and analysts say.

This category of products from companies such as InXight Software Inc., Semio Corp. and Plumtree Software Inc. is bringing text-retrieval capabilities to the next level, said Geoffrey Bock, an analyst at Boston-based Patricia Seybold Group, and will gain steam within the next year to 18 months.

So how does text mining differ from data mining? According to Bock, text mining considers all the information online, determines key relation-

ships and messages in that information, then helps users understand it. By contrast, data mining develops theories and/or models based on quantitative analysis of data.

The Thomson Corp. (www.thomcorp.com), a multinational publishing conglomerate in Stamford, Conn., has been beta-testing Semio software during the past nine months and recently installed the latest version, SemioMap 2.1.

Mark Turner, head of the Natural Language Processing Lab in Rockville, Md., said Thomson owns a slew of specialty publications such as the *Physician's Desk Reference*, the *Toronto Globe & Mail*, college textbook publishing groups and regional U.S. newspapers. Those companies process scads of free text.

According to Turner, Thomson previously used standard

search-and-retrieval products and software developed in-house. But those tools were too proprietary or specific; the company needed one tool for a variety of site searches.

Turner said the only drawbacks to the newest version of SemioMap are that it's a bit slower than its predecessor and doesn't handle short documents well — a problem for the Thomson companies that handle only titles and abstracts. But the package was easy to integrate with existing systems, he said.

The software gathers re-

Bock said text mapping and mining technology isn't really geared for daily operations. For instance, network managers would need to pore through entire reports, rather than just tagged documents. According to Semio officials, the product is aimed at the professional and research markets.

According to John G. Ferrari, a process and technical manager at Monsanto Corp., the Chicago-based company is adapting portal software from Plumtree Software to make its intranet information more manageable for and accessible to knowledge workers.

The software gathers re-

search, corporate and competitive information from different media — for example, the Internet, Microsoft Corp. Office documents and Notes database information — in one spot.

Monsanto used a card catalog metaphor in revamping the Plumtree interface — switching from the standard Yahoo-style look and feel to a hierarchical set of folders, with a navigation bar on the left and links to story titles and summaries in the main frame of the page.

Ferrari said a few hundred Monsanto employees are piloting the application now, with an eye toward a company-wide rollout. ▀

Knowledge Management Tools

| VENDOR | INXIGHT SOFTWARE | PLUMTREE SOFTWARE INC. | SEMIO CORP. |
|---------------------|--|--|--|
| Products | The Hyperbolic Tree, Summarizer and VizControls | Plumtree Server 2.0 | SemioMap 2.1 |
| What they do | User interfaces that help clarify relationships between pieces of data | Portal software that helps users access and organize corporate information | Text mining software that extracts relevant information from unstructured text and presents it in a logical form for users |

Winner of the Database Race.

Ever wonder if there might be a new, powerful and easy-to-use database management system that can solve your performance and scalability problems?

It's called Caché – the "post-relational" DBMS that offers advanced object technology, Web connectivity and faster SQL performance. Caché can do so many good things that it has won a prestigious international award as "the most exciting new database product".

Caché is already in use today in hundreds of enterprises, ranging from small entrepreneurial companies to the world's largest client/server network.

Caché is the latest database technology from InterSystems, the worldwide leader in high performance database products for transaction processing, with over 2,000,000 users... and 20 years of database experience.

The "best new database" is from a well-established company.

"Best New Database"

-1998 Information Management Award Sponsored by Deloitte & Touche Consulting Group



BRIEFS

PC Planning Pains

What are your biggest headaches in PC planning and purchasing?

| | |
|-----|-----------------------------------|
| 42% | Fast changes in market |
| 26% | Establishing business priorities |
| 24% | Availability/distribution |
| 18% | Internal politics |
| 12% | Maintaining standards |
| 12% | Decentralized planning/purchasing |

Base: Survey of 50 Fortune 1,000 companies; multiple responses allowed

SOURCE: FORRESTER RESEARCH INC., CAMBRIDGE, MASS.

Mobile Assistant IV

By Mark Lutz
Cybernaut Corp. is offering Mobile Assistant IV, a voice-activated wearable PC designed for hands-free access to applications. It includes a belt-worn computer with a 233-MHz Pentium from Intel Corp., a head-mounted color display or flat-panel color digitizing display, a 1-pound battery pack and integrated voice-recognition software.

According to the Fairfax, Va.-based company, Mobile Assistant IV is aimed at users who perform tasks such as manufacturing inspection, heavy-equipment maintenance and insurance claims adjusting.

Pricing starts at \$4,995. Cybernaut (703) 631-6925 www.cybernaut.com

Fibre Channel

Data General Corp.'s Clarion FC5703 Fibre Channel disk array is shipping. According to the Westboro, Mass., company, the array can house between 10 and 30 Fibre Channel disk drives. It has redundant components, dual storage processors and mirrored cache. Heterogeneous platform support—including Windows NT, NetWare, AIX and Solaris—is included.

Pricing for Clarion FC5703 starts at \$35,000.

Data General
(508) 366-8911
www.dg.com

XEON-BASED SERVERS LIFT HIGH-END NT APPS

New Intel chip supports as many as four processors per server; vendors respond

BY APRIL JACOBS

WITH INTEL Corp.'s release last week of its latest Pentium II Xeon chip, which supports the use of up to four processors per server, vendors unleashed a crop of new four-way machines designed to boost the performance of high-end Windows NT applications.

The Santa Clara, Calif., chip maker also announced plans to increase the bus speeds at which its chips can operate beyond 100 MHz and promised by midyear to ship motherboards and chip sets that vendors can use to build standard eight-way systems.

Among the vendors that announced four-way-capable servers last week were Compaq Com-

puter Corp.; Hewlett-Packard Co.; Round Rock, Texas-based Dell Computer Corp.; Westboro, Mass.-based Data General Corp.; and North Sioux City, S.D.-based Gateway.

In addition to having greater speed, the new chips can accommodate up to 2 MB bytes of Level 2 cache, twice the on-board cache as the 400-MHz chips already on the market.

Moving on Up

The higher chip speed and increased cache mean better performance for transactional applications that involve database access, which will be important as Intel-based servers move up the food chain in the corporate market, according to analysts.

"A lot of folks on the hardware side have been anticipating this and looking forward to it," said Amir Ahari, an analyst at Framingham, Mass.-based International Data Corp. (IDC), a sister company to Computerworld.

Ahari said he expects four-way servers to help boost server sales, which hit a relatively flat period during

Coming Soon

New processors from Intel in this year's first quarter include:

| CHIP | AIMED AT |
|--|--------------------------|
| 300-MHz Pentium with MMX and 266-MHz Celeron | Low-end laptops |
| 450-MHz Pentium II Xeon | Servers and workstations |
| 400- and 450-MHz Katmai | High-end desktops |
| 333- and 366-MHz Pentium II | Laptops |

the past several quarters.

But four-way systems won't outstrip sales of less expensive two-way systems, he added, because four-way systems generally start at about \$9,000 for a single processor configuration that can be upgraded to four processors, compared with starting prices of about \$5,000 for single-processor systems that can be upgraded to two-way systems.

Users interviewed in the past several weeks have given the Xeon platform a warm reception. For those moving more business-critical applications to NT, the improved clock speeds, the increased cache and the wider availability of the systems are welcome.

Shipments of systems using earlier versions of Xeon chips were delayed this summer because of production delays at Intel.

"Until Xeon came out, we weren't comfortable with the idea of porting our database systems to NT, but we are now going to start testing and doing benchmarking," said Larry

Garden, director of technical services at Mississauga, Ontario-based Brewers Retail Inc.

Brewers Retail has about 480 NT servers that run Sybase databases for its point-of-sale

systems as well as 12 Unix servers that run corporate management systems.

A Wintel Wonderland?

"One of the things we've been wanting to do is standardize our environment," Garden said.

For vendors that also supply Unix and RISC-based systems, the progression toward Intel and Windows NT is inevitable and not completely unwelcome. For example, both IBM and HP announced server sales strategies that focus on allowing their mainframe or Unix sales forces to sell NT and Intel-based systems at the same time.

According to IDC, Windows NT server shipments, which numbered 1,268,000 in 1997, are predicted to total 1,400,000 in 1998 and up to 1,831,000 by the end of 1999.

And NT's market share is growing while the Unix market shrinks. NT grew in market share from 19.3% of the worldwide server operating system market in 1996 to 34.2% in 1997. Unix dropped from 48.9% of the market in 1996 to 45.8% in 1997. ▀

FLAT-PANEL DISPLAY

This is one of four flat-panel displays available from Princeton Graphic Systems. The panels support the Mac OS. According to the Santa Ana, Calif., company, the 15-in. DPP 560 shown here pivots for portrait or landscape viewing and costs \$1,099.

Princeton Graphic Systems
(714) 751-8405
www.prgr.com



"ObjectStore is an innovative, proven object database management system with the price/performance we need right now and an architecture that positions us well for the future."

- David deMilo, Knight Ridder New Media



The Big News At Knight Ridder Is ObjectStore

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the industry. With the track record to go with it. When David deMilo saw what ObjectStore had done for demanding customers like AT&T, Time Warner and Ray Networks, everything else was old news.

Working together, Knight Ridder and Object Design developed a fast class Customer and Content Management solution significantly ahead of client expectations -- giving Knight Ridder a competitive advantage in the fierce publishing business.

If you've made Java part of your technology strategy and you want a "best of class" Java database solution, you should find out more about ObjectStore. Check out www.objectdesign.com or call 1-800-962-9620.

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IDG also provides opinion, insight and inspiration through their leading research company (IDC), best-selling book titles and numerous worldwide industry events. All of which make IDG the most trusted source for technology information anywhere in the world.

Answers for the Information Age



BRIEFS**Internet Publishing**

Allegis Corp. recently released Net-It Central 3.0, software that lets users publish desktop documents on an intranet or extranet.

According to the San Francisco company, the documents can be produced using a standard browser and can be viewed without plug-ins. The software retains a document's original appearance. Publishers can store information such as project name, author or keywords as searchable meta data written in Extensible Markup Language.

Net-It Central costs \$9,995 per server with unlimited users.

Allegis
(415) 551-0600
www.allegis.com

Web Presentations

Companies can present live, interactive presentations over the Internet using PlaceWare Web Conference Hosting Service, now available from PlaceWare Inc.

According to the Mountain View, Calif., company, the service includes a virtual venue for the event, Net connectivity, pre- and post-presentation support and maintenance, calendar planning and presentation rehearsals. Designed for users who want multimedia Web conferencing without having to maintain their own servers, the service features real-time polling, chat and live question-and-answer sessions.

A one-year license for a 10-user conference setup costs \$1,080, not including server software.

PlaceWare
(650) 526-6100
www.placeware.com

Networking Kit

WebGear Inc. has announced AviatorUSB, a wireless, Universal Serial Bus (USB) networking kit for desktop and notebook computers.

According to the San Jose, Calif., company, the hardware modules plug in to the USB ports on Windows 95- and Windows 98-based PCs and communicate via 900-MHz radio frequency technology. The RF connections can be used to share files or access peripherals and can transmit data up to 125 feet apart at speeds up to 1M bit/sec.

A two-user AviatorUSB kit costs \$199.99. Extra modules cost \$99.

WebGear
(408) 271-9888
www.webgear.com

'99 MAY BE GIGA ETHERNET'S YEAR

Low switch prices and user need for bandwidth set the stage

BY BOB WALLACE

IN THE SIX MONTHS since Gigabit Ethernet became a standard, plummeting switch prices and widespread user need for more bandwidth have combined to make 1999 look like a banner year for the technology.

Many companies already are using the 1G bit/sec. technology — which provides far more bandwidth than 100M bit/sec. Fiber Distributed Data Interface (FDDI) and Fast Ethernet — to replace congested backbone networks and provide wider pipes to high-end servers.

Others are following because per-port pricing for Gigabit Ethernet switches has plunged from about \$2,500 to less than \$1,500 in some cases. Consultants said they expect the cuts to continue as price competition intensifies.

Falling Prices

"I expect the price per Gigabit Ethernet port to fall to the \$700-to-\$750 vicinity by the end of the year," said Craig Johnson, president of Pita Group, a Portland, Ore., consultancy. "As a result, the technology will come into its own in 1999."

That's good news for users who are looking for higher-



Pricing and product dependability are now where it starts to make sense to use Gigabit Ethernet.

VIRGIL PALMER,
AIR PRODUCTS & CHEMICALS INC.

speed links to servers.

"Today, a Gigabit Ethernet server [adapter card] costs around \$1,000, but that will drop to around \$800 this year," said Rich Seifert, president of

Networks and Communications Consulting, a Los Gatos, Calif., research and consulting firm. "Gigabit Ethernet is popular for the same reason Ethernet was when it first came out. It's cheap bandwidth, and everyone supports it."

Researchers agreed, citing Gigabit Ethernet port shipments that started to climb quickly at the end of last year.

Although only 35,000 ports shipped in the second quarter of 1998, 164,000 — almost five times as many — will ship in the first quarter of this year, according to Dell'Oro Group, a Portola Valley, Calif., research firm (see chart).

"Pricing and product dependability are now where it starts to make sense to use Gigabit Ethernet," said Virgil Palmer, director of networks and telecommunications at Air Products & Chemicals Inc. in Allentown, Pa. "We're starting to adopt a Gigabit Ethernet strategy."

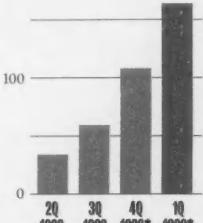
The company soon will install Gigabit Ethernet switches in front of its server farm to boost bandwidth to individual servers, he said. Today, servers at Air Products & Chemicals are linked using FDDI.

Pricing and the need for more bandwidth to handle capacity-intensive enterprise re-

Need for Speed

Worldwide port shipments of Gigabit Ethernet

200 IN THOUSANDS



*Projected

source planning (ERP) and video training applications drove Mike Grech to order a Gigabit Ethernet backbone network.

Not So Fast

"Our FDDI network only gave us 100M [bit/sec.], and we needed more speed," said Grech, LAN administrator at Martinez Refinery Co. in Martinez, Calif. "We looked to the future, and Gigabit Ethernet is where we see it going."

Although Gigabit Ethernet will provide a throughput boost compared with 100M bit/sec. technologies such as FDDI and Fast Ethernet, experts warn that users won't see 10 times the performance.

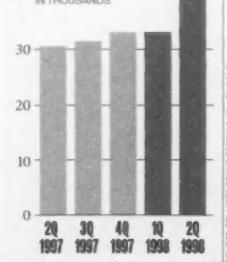
"What you get depends on the applications you're running, your servers and other attached internetworking devices, as they may not be able to take advantage of the gigabit speed," Seifert said. ▀

SNAPSHOT

Slow Growing

Worldwide shipments of midrange router ports

40 IN THOUSANDS



Fans Flagged for Piling on at Fiesta Site

Bowl game's page closed before kickoff

The Fiesta Bowl was a defensive struggle. But the hardest hits were delivered not by the University of Tennessee or Florida State football players, but by couch-bound fans who tackled the game's Web site.

ABC, ESPN and Infoseek Corp.'s Go Network created the "Enhanced TV" site to supplement the TV broadcast. Visitors could access a "push" channel for real-time game sta-

tistics, player profiles and other information.

Apparently, the idea was too good for its own good. Monstrous traffic forced ABC to turn users away early. "They were refusing connections from new visitors even before kickoff," said Tom Dahm, chief technical officer at NetMechanic.com, whose Server Check Pro service monitored the site. NetMechanic.com is a

division of Monte Sano Software LLC in Huntsville, Ala.

Check Pro monitors servers by downloading a file every 15 minutes. The service tracks the amount of time required to fetch the page and alerts the webmaster if it takes too long or the page is incomplete.

In the first quarter, ABC posted a message on the site asking users to try again later. The logjam cleared by half-time. But newcomers were still locked out, apparently as a precautionary move. ▀



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BRIEFS

Who's Buying What

SHIVA CORP. last week announced that Bentley College in Waltham, Mass., has implemented the Bedford, Mass., vendor's LanRover VPN Gateway to provide secure remote access to students, faculty and staff.

The business school's users can connect to E-mail, the Web and library services. More than 750 users will be added to the virtual private network early this year.

CABLETRON SYSTEMS INC. last week announced that Pennsylvania's Dallas-Town Area School District has chosen the Rochester, N.H.-based vendor's products to support distance learning, Internet access and computer-based instruction.

The vendor said the deal is worth roughly \$300,000 and covers Cabletron's Smart-Switch Router and Smart-Switch systems.

According to XYLAN CORP., the U.S. Air Force has installed the vendor's OmniSwitch LAN switch at more than 40 military hospitals across the U.S. The Calabasas, Calif., company's switches were installed by the TriServices Infrastructure Management Program Office. The value of the deal wasn't given. The OmniSwitch provides any-to-any switching and virtual LANs.

PeopleSoft Spins Off Momentum

PeopleSoft Inc. completed its \$250 million spin-off of a software development company at the end of 1998 and named former chief financial officer Ronald Cukic as CEO of the new venture.

Pleasanton, Calif.-based PeopleSoft has announced plans for the development spin-off in November.

The stand-alone company, called Momentum Business Applications Inc., will manage development of new intranet and data-analysis applications for PeopleSoft.

New Siebel Office Systems

Siebel Systems Inc. has announced Siebel 99, a suite of Web-based, front-office applications for enterprise relationship management.

According to the San Mateo, Calif., company, the suite includes Call Center, Field Service, Marketing Enterprise and Product Configurator modules.

A Sales Enterprise module provides tools for sales pipeline management and account management. A Service Enterprise module offers tools for service request management, service environment profiling and problem resolution.

Pricing starts at \$1,350 per user for certain modules. Siebel Systems (650) 295-5000 www.siebel.com

OpenGL in Future Mac OS Versions

Apple Computer Inc. will incorporate the OpenGL application programming interface and software library into future versions of the Mac OS operating system as a result of a licensing agreement with Silicon Graphics Inc. Developed by SGI, OpenGL - supported on most major operating systems - is a popular software library that offers tools for functions such as rendering, texture mapping and special effects for three-dimensional graphics applications. A beta version of Apple's OpenGL software will be available later this month.

New Credit-card App from Synergy

Maywood, N.J.-based Synergy Software Corp. last week announced CCPAY, a credit-card processing application that uses IBM's San Francisco Java format. CCPAY automatically processes the transaction and manages account settlement with the financial institution.

FRANKLY SPEAKING

Your own Y2K

WILL WE EVER do something as stupid as creating the year 2000 problem again? That's what someone asked me on New Year's Eve, partying away the minutes as 1998 ticked down to 1999. I had to laugh. Will we ever again create a mess as foolish, shortsighted and unnecessary as Y2K? Of course we will. We've been doing it for years. We're doing it right now.

Systems whose year 2000 problems aren't fixed will become suddenly and catastrophically obsolete when midnight chimes at the end of this year. We ignored that fact for years — which is why we're now beating our brains out to fix or replace those obsolete systems.

But the truth is, all hardware and software will eventually be obsolete. We've got to plan for that obsolescence — and then scrap systems as soon as we see they're obsolete. Otherwise, we're just creating our own private Y2Ks.

Learn from AT&T

TAKE THE FAMOUS case of AT&T, which discovered its own private Y2K eight years ago when hungry competitor MCI (now MCI WorldCom) introduced its Friends & Family long-distance program. What MCI really offered was a marketing gimmick: The company billed you less for long-distance calls that went to certain people you chose.

AT&T's long-distance business couldn't compete. The company's creaky billing system wasn't flexible enough to allow special billing options. The obsolete software had to be rewritten. Meanwhile, Friends & Family let MCI scarf up 7 million AT&T customers in a single year.

It wasn't a clock striking midnight that made AT&T's billing system obsolete. It was a change in business. The result wasn't quite as catastrophic as the millennium bug — but it was every bit as foolish, shortsighted and utterly unnecessary.

Ah, but we're not as stupid as AT&T, are we?

Sure we're not. Look around your own IT shop. Count the legacy systems you've been patching, kludging, tuning and tweaking for years. They're obsolete — and you know it.

Someday soon, some sudden change in business, some unanticipated left turn by a competitor,

will make them unusable. Then you'll be feverishly rushing to fix or replace them. They are your own private Y2K just waiting to happen.

What about the systems you're building now? Do you design them for a long life, with plenty of room for future capacity? You're missing the point. When the business changes, all that future capacity will be useless. The system will be obsolete and patching it up to match the new business model will only prolong the pain.

You're better off building clean, minimalist systems that go up quickly, do what you need today and can be scrapped and replaced fast. Otherwise, you're building yourself one big, fat, private Y2K after another.

Does your accounting department insist that hardware be fully depreciated before it's replaced? That takes years — and today, last year's PCs can't run this year's applications. They're obsolete, and your help desk, software developers and network managers are burning up your budget to keep junk limping along.

Don't Waste Money

YOU SHOULD be using that budget to make your company more effective, competitive and aggressive. But instead, you've got a private Y2K that never ends.

Sure, replacing obsolete systems is expensive. But keeping them is even more expensive.

Next New Year's Day, we'll see just how expensive it is. Zero hour may be a smooth trip, a bumpy ride or a complete disaster. But one way or another we'll be rid of one very expensive

group of obsolete systems.

When are we going to get rid of the rest of them? ▀

FRANK HAYES, a Computerworld staff columnist, has been writing about computing for 20 years — which probably means he's obsolete, too. His Internet address is frank_hayes@cw.com.



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AGENDA

9-12:00 MORNING SESSION

- **Introduction and Welcome** Vicki J. Brown — Senior Vice President, Worldwide Operations and Marketing.
- **Economies in a Tailspin...Will IT Land Upright?** Philippe de Marcillac — Senior Vice President, Global Research
- **Survival Tactics for The New Internet Economy** Frank Gens — Senior Vice President, Internet Research
- **Can Today's IT Leaders Compete in the New Internet Economy?** David P. Vellante — Senior Vice President, Systems, Software, Storage, Semiconductor, Channels, and User Research
- **Viable and Dying Technologies for the New Economy** John Gantz — Senior Vice President, Personal Systems, Services, and Collaborative Research

| Session A 1:05-1:45 | Session B 1:55-2:35 | Session C 2:45-3:25 | Session D 3:35-4:10 |
|---|--|--|---|
| Track 1: Internet Commerce: Driving the New Economy | | | |
| What's the ROI for Internet Commerce? Michael Sullivan-Trainor | The Boom in Business-to-Business Commerce Joan-Carol Brigham | Targeting the Consumer Commerce Site Barry Parr | Project Atlas: Commerce Around the World Jill Franklin |
| Track 2: Devices for the New Economy | | | |
| The Old Guard: PCs Bruce Stephen | The Next Generation: Consumer Devices Kevin Haase | The Digital Glue of Pervasive Computing Sean Kaldor | Channels for the Millennium Tony Amico |
| Track 3: Systems and Servers in the New Economy | | | |
| Server Workloads: Understanding Server Deployment Susan Franklin | What's Wrong with IBM? Jay Brattain | Winning Server and Storage Strategies—It's All About Channels Janet Waxman | How the Lunatic Fringe Has Become Mainstream Computing Debra Goldfarb |
| Track 4: Servicing the New Economy | | | |
| Opportunity In The Interactive Enterprise: Moving Beyond Commerce Traci Gere | The Business Solutions Challenge: Getting Used to the New Rules Susan Siew-Joo Tan | "Smart" Services: Embedding Intelligence in the Support Process Chris Hoffman | Stopping the 21st Century Hacker: Security Services in the New Economy Rich Brewer |
| Track 5: Software Engines for the New Economy | | | |
| The Networked Enterprise: Turning Applications Inside Out Clare Gillan | Programming E-Business Steve Hendrick | Will We See Self-Managed Systems? Paul Mason | Is Microsoft's Strategy for NT in the Enterprise the Same As Yours? Dan Kusnetzky |
| Track 6: Building the New Economy | | | |
| Preparing for the Quantum Leap in Bandwidth Gigi Wang/Rick Villars | Providing Bandwidth for the Next-Generation Internet Lee Doyle | The Enterprise Network in the Internet Age Mark Leary | IP Communications: Driving Convergence but Serving Legacy Mark Winther |

4:15-5:00 Closing Session

- **Next Generation Internets** Dr. Robert M. Metcalfe — Vice President, Technology, IDG

Success is Calling

ENGINEERING

Senior Software Engineers (Telephony)

Assist in design and development of an object-oriented, telephony application. Application will be developed using OOA/OOD and Visual C++/MFC. Requires 5+ years of experience, 3-5 years in C++, 2 years in C++ and OOA/OOD preferred; Windows NT internals a plus. Education: BA/BS. **Code: SETC**

Senior Software Engineers (Database)

Assist in design and development of object-oriented, client/server applications utilizing Windows NT and Oracle. Applications are developed using OOA/OOD and Visual C++/MFC/ActiveX technologies. Requires 5+ years of programming experience, 3+ years in C++, 2 years in OOA/OOD, Win32/MFC/ActiveX and relational database (Oracle preferred). Education: BA/BS. **Code: SEDC**

Software Engineer (Data Warehouse)

Assist in design and development of Web-based data information systems utilizing Windows NT/Sun Solaris and Oracle. Applications are developed using WebFOCUS, Java, UNIX shell scripting and PL/SQL. Requires 3 years of programming experience, 2 years in relational database (Oracle preferred) and 1 year in 4GL reporting language (FOCUS a plus). Education: BA/BS. **Code: DWC**

Software Engineers - System Reliability

Analyze system configurations and business requirements, develop framework and functional plans, perform tests, automate test processes and execute test plans. Requires thorough understanding of testing methodologies and automated development tools, plus experience with relational databases, SQL, GUI, Vb6 or reporting applications. Telephony and programming experience preferred. Various levels available. **Code: SQAC**

Senior Technical Writer

Support software documentation needs as well as other company internal technical documentation needs. Requires 4+ years of experience producing a variety of technical documents for software projects including technical specifications, user manuals, configuration and installation manuals, and technical release notes. Education: BA/BS. **Code: TWC**

Network Operations Center Technician

Support our prepaid phone card application, network and hardware equipment. Analyze and troubleshoot system problems that may involve Cisco routers, T-1 circuits, Windows NT and others. Requires ASEE or equivalent plus 2 years supporting data and telecom equipment. Must be willing to work rotating shift. Entry-level candidates with appropriate technical degree may be considered. **Code: NOCC**

Field Service Engineer

Position requires 3-5 years of hands-on experience in telecommunication systems installation, troubleshooting, and maintenance. Candidates should have experience in telephony, wireless and copper/fiber terminating facilities, as well as a strong understanding of basic electricity, electronics and computers. AS degree or equivalent technical or military experience is also required. Although the position is based in Woburn, EXTENSIVE travel is expected. **Code: FSEC**

Project Manager (Internal)

Coordinate and implement internal projects; track and maintain status of major hardware and software releases and customer requests/needs. Includes problem tracking, tracking, scheduling, status report generation, new release testing support and general problem resolution. Requires BA/BS or equivalent, 1-3 years of project management experience in a fast-paced, hi-tech organization; and excellent writing, speaking and organizational skills. **Code: PMC**

Senior Project Manager - Y2K

Oversee the company's Y2K program, including management of relationships with key customers, overseeing Y2K test efforts and monitoring external vendors to ensure that they are Y2K compliant. Will also directly manage dedicated Y2K personnel. Requires BA/BS in relevant field, 7-10 years of project management experience in a fast-paced, hi-tech organization and a thorough understanding of Y2K issues. **Code: YMC**



Senior QA Engineer - Y2K

Participate in Y2K testing of the Prepaid Wireless platform; learn product functionality, develop test scripts and test set-up; build test configurations, execute tests, analyze results and document test findings and recommendations. Requires BSCS or related degree and 4+ years of experience in testing projects. Experience with Oracle, NT, PowerBuilder or call switching and processing systems is a plus. **Code: YQC**

Remedy Application Specialist

Redesign and update existing Remedy schemas, develop new schemas, and act as Remedy resource for Systems Administration. Requires ASCS or related degree and 2-3 years of relational database experience using both UNIX and Windows. Remedy experience is a definite plus. **Code: RSC**

Dataable Administrator

Create and update various database tables within the Oracle production environment. Analyze data within existing tables to ensure accuracy, troubleshoot data issues, and assist Oracle DBAs with troubleshooting. Requires BA/BS in related field, 3-5 years of related experience, and knowledge of SQL, Oracle, and MS Access. **Code: DTAC**

CLIENT SUPPORT

Technical Support Manager - Reporting

Lead a team of 6-10 people responsible for the on-time production of accurate daily, weekly and monthly reports for BCGI's customers. The team is also responsible for username and security administration for BCGI's customer care and carrier statistical reporting applications. Requires BA/BS (MBA preferred) and 3-5 years of management experience leading a technical team in an operations, production, and/or support environment. Also requires strong communication and troubleshooting skills, and familiarity with database applications. Experience in wireless telecommunications is a definite plus. **Code: RMC**

Product Manager

Work collaboratively within BCGI and with our clients to gather requirements for our prepaid wireless product, analyze market needs, prioritize development efforts and drive the product life cycle. Requires vision and creativity to manage product requirements and meet the changing needs of the wireless communications industry. You must have 5+ years of experience with product definition in a software development environment and outstanding communication skills. Previous experience in telecommunications, especially wireless applications, is preferred. BA/BS required; MBA preferred. **Code: PC**

Director, Corporate Marketing

Develop and manage corporate marketing programs, policies, and procedures; create messaging and communications strategy; direct statistical and competitive analysis activities; develop and manage marketing communications programs. Requires BA/BS in relevant field, 5+ years of related marketing experience, excellent writing and communication skills, and strong management skills. Travel is required. **Code: MDC**

Market Research Analyst

Provide competitive and statistical analysis on industry data including general industry trends and client specific data. Identify and track competitor information and create library of industry data. Requires BA/BS or equivalent, 2-5 years of market research experience and excellent written and verbal communication skills. **Code: MAC**

Director, Account Management

Lead and direct our Prepaid Services Account Management team. Assume responsibility for customer satisfaction by communicating carrier issues internally and working collectively with BCGI resources to resolve operational concerns. Requires BA/BS in relevant field, 5-10 years of experience in providing superior client support and excellent interpersonal, motivational and leadership skills. Wireless experience is preferred. Ability to work under pressure is essential. **Code: DAMC**



BOSTON COMMUNICATIONS GROUP
Please visit our web site at <http://www.bcfg.net>.

Boston Communications Group, Inc. is a leading service and systems provider to wireless telephone carriers. Founded in 1988, BCGI introduced a new service for processing specific types of roaming phone calls. Now, additional client offerings also include customer service outsourcing, voice systems for wireless communications, and the leading wireless prepaid calling card system in the country. BCGI provides one or more of its services to carriers who serve over 90 percent of the United States population, including 9 of the 10 largest cellular carriers, by number of subscribers, in the U.S. We currently employ over 1,400 people across four divisions. Our continued growth has created numerous opportunities including the following:

Data Analyst

Perform quality control, analysis and distribution of our prepaid client reports (weekly, monthly, and ad-hoc). Assist in troubleshooting data, report issues, etc. Requires BA/BS, strong PC skills including MS Office and excellent analytical and organizational skills. **Code: DAC**

TELESERVICES

Forecast & Scheduling Manager

Manage staff and activities of Forecast and Scheduling group supporting 700+ agents across 4 call center locations. Manage and analyze call volume forecasts and staffing requirements to ensure maximum labor efficiency. Manage agent productivity to support continuous process improvements. Utilize workforce management system to forecast, schedule, conduct intraday management, real-time and historical adherence and vacation/holiday planning. Requires BA/BS and 3-5 years of directly related experience. Statistical background is helpful. **Code: FSCM**

Call Center Supervisors

Motivate, coach and develop call center staff in dynamic, fast-paced environment. Manage a team of 15+ representatives in providing quality service to our wireless customers. Requires BA/BS or equivalent plus 2 or more years of call center supervisory experience and outstanding interpersonal and leadership skills. Weekend shifts required. **Code: CCS**

Customer Service Representatives

Responsibilities include processing calls in accordance with company objectives, troubleshooting and resolving customer problems and staying informed of client-specific changes. Requires excellent communication and interpersonal skills plus computer and typing proficiency. High School diploma required and experience in retail, customer service, telephone support or related fields preferred. Weekend shifts required. **Code: CSR**

FINANCE & HUMAN RESOURCES

Financial Analyst

As the expert for specific client accounts in a rapidly growing division, your knowledge of contracts, capital configurations and upgrades, pricing, revenue, and A/R will help you analyze results and make recommendations for improvements. Also responsible for monthly revenue forecasting and analysis including revenue recognition and analysis of unearned revenue plus corresponding A/R analysis. Requires BS/BBA in Finance or related degree and 2-4 years of relevant experience. Excellent PC skills including MS Excel also required. **Code: FAC**

Capital Project Analyst

Reporting to the Finance Manager of a high-growth division, you will be responsible for the tracking of capital projects including monthly reporting of budget vs actual results, project and departmental reporting. In addition, you will assist in the accounting of internal software development as well as capital cost summarization in support of pricing of new features and functionalities. Requires BS/BBA in Finance or related degree, 2-4 years of relevant experience and excellent PC skills including MS Excel. **Code: CPC**

HRIS Manager

Responsible for the development, redesign and management of all HR processes and training of HR staff to ensure overall success in implementing a new PeopleSoft Human Resource Information System. Ability to interact effectively and be influential with internal customers at all levels from multiple locations. Must have demonstrated success with process improvement efforts in an HR organization including experience with identifying appropriate action plans and monitoring progress to ensure project deliverables. Requires BA/BS in relevant field and 5+ years of HRIS or IS experience working with large scale, multifaceted projects, plus solid process mapping skills. **Code: HRC**

BCGI offers exceptional growth opportunities and highly competitive compensation, plus medical/dental, tuition reimbursement, 401(k), ESP and more! Please submit your resume and salary requirements to Job Code _____, Boston Communications Group, Inc., 100 Sylvan Road, Woburn, MA 01801; Fax: (781) 994-8264. Email submissions preferred (please include job code and last name in Subject line) to: jobs@boscomm.net. An Equal Opportunity Employer.

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The momentum of a vibrant, visionary company. With an energetic team, we're pushing the envelope to quickly advance our mission to success. Software is leading the industry with unique application development and database techniques to facilitate IS organizations worldwide. In our collaborative atmosphere, you'll have the opportunity to pursue your best ideas. And be generously rewarded for your outstanding contributions. Power your success with the energy and opportunities of a software powerhouse. Tap the energy of Progress Software.

QA Engineering Manager
Nashua, NH Handson role within the Internet Software Quality Products unit developing test strategy, defining methodologies, and leading a small group of engineers in designing and implementing new manual and automated tests for networking applications running on NT and UNIX. You will be responsible for the design, development, and actual testing of applications (coding experience required). You will have overall responsibility for planning, scheduling, and monitoring all QA work. BSCS or equivalent experience in a hands-on QA management or project lead role, plus an additional 4+ years as a senior QA engineer is required. Experience with various QA methodologies, networking, Internet protocols (TCP/IP, SNMP, ATM, etc.), automated testing, familiarity with Windows development tools and technologies, and Java test experience is a plus. E-mail resumes to hr@progress.com

Architect / Release Engineering
As a senior technical contributor in our Product Release organization, you will architect, design and implement a development release environment that meets our development needs and schedules. With your experience evaluating and using a variety of commercial development tools in a multi-release, multi-platform (UNIX, NT) software environment, you will be a major influence on how our products are developed, designed, and delivered, both faster and higher quality. As the senior technical "go to" person, you will help solve difficult software engineering problems to a person toward reaching these goals. We require a BSCS (MCSIS preferred) and 10+ years in product release, release management, experience in development tools and SCM, and a solid understanding of development and QA. E-mail resumes to hr@progress.com

Principal Software Engineer
Nashua, NH As a key contributor in our Application Development Environment (ADE) Test group, you will design, develop, and maintain the ADE modules as well as the core ADE interface to the Applicivity and the ADM using the PROGRESS 4GL. You will have the opportunity to provide our customers with the development tools they need to help them develop and deploy state-of-the-art n-tier and Web applications. We require a +8 years' software development experience including a minimum of 1 year PROGRESS 4GL GUI development, and solid software design skills. Web application development experience is a plus. E-mail resumes to hr@progress.com

Telesales Representative
In our environment of innovation and teamwork, you will generate exciting new business opportunities for our CDR sales unit by prospecting for new business potential and leads. To qualify, you must have 5+ years high tech experience and a demonstrated ability to prospect and close new business. Superior communication skills and an extraordinary desire to succeed is imperative in this role. Requires 3-5 years in the sales / direct marketing industry. The ideal candidate must be a self-starter, able to take the initiative while working independently and efficiently. Strong time management skills and the ability to set priorities and meet deadlines are critical. Knowledge of Crystal reporting, 4GL programming, and sales automation system would be valued experience. Solid business communication, writing and telephone skills are essential as this position will interface daily with both the Marketing and Sales organizations. E-mail resumes to hr@progress.com

Systems Engineer - Corporate Sales
This individual will have the responsibility for providing Systems Engineering Support to our Corporate Sales organization. In this role, you will be a technical consultant and the primary sales representative for formulating account strategies and plans. You will then be responsible for implementing the technical aspects of the account plans. Other responsibilities include preparing and delivering technical presentations and demonstrations. Qualified candidates will have a strong background in one or more of the following: technology and architecture, network management systems, application development, client/server Internet and/or object-oriented application design. Technical knowledge of PROGRESS products and expertise in PROGRESS V8 Tools or Webspice is desirable. Experience with and exposure to the sales process is preferable. Strong communication and presentation skills required. Position requires travel. E-mail resumes to hr@progress.com

Business Development Center Specialist

As part of the Inside Sales organization, this individual will be responsible for the accurate and timely flow of leads from our contracted outsourcers to the North American sales force. Other duties will include the following: Provide detailed reports to the manager of the contracted outsourcing company on daily BDC statistics, update the Lead Management System with new telesales scripts. Manage all responses (150+ market codes) and provide detailed analysis to management, work closely with the Account Manager and Database Manager to implement new reports, data generation and sales letters to customers, new products, train new employees on the BDC methodology, execute history queries and research within the database. The BDC coordinator is the point of contact for the marketing outsourcing corporate infrastructure which would be used in the lead flow process. Requires 3-5 years experience in sales or database administration. The ideal candidate must have advanced Excel and programming expertise. E-mail resumes to hr@progress.com

Technical Account Manager

This individual will manage technical relationships with targeted strategic accounts. In this role, you will be working closely with the Sales organization to formulate account strategies and plans. You will then be responsible for implementing and managing the technical aspects of account plans and acting as a champion in Bedford for the account. Other responsibilities include maintaining various Corporate Accounts Sales and Sales Support activities such as high-level presentations, detailed technical management of large sales opportunities. The ideal candidate will have 7+ years of industry experience with previous technical account management experience. Excellent interpersonal and project management skills, as well as excellent written and verbal communication skills. Sales Support experience or experience working in sales solutions is required. Strong background in one or more of the following technology areas is required: relational database management systems, application development, client / server, Internet and/or object-oriented application design. Technical knowledge of PROGRESS products and expertise in PROGRESS V8 Tools or Webspice or Applicivity is highly desirable. Position will require some travel. E-mail resumes to hr@progress.com

District Sales Manager

Ideas, NH Exciting opportunity exists in our Ideas, NH office for District Sales Manager. The territory for this position is New Jersey, New York City, Connecticut and Massachusetts. The ideal candidate will encompass managing named direct and application partner accounts as well as prospecting and recruiting new accounts. You will be selling CORE Product Line, Applicivity Product Line and services to named accounts. This position will require 50% travel. 7+ years software selling experience with account management and a Bachelor's degree are preferred. E-mail resumes to hr@progress.com

Customer Programs Marketing Specialist

This individual will be responsible for defining and implementing critical marketing programs targeted at North American customers of Progress products. A solid background in marketing, sales, and/or advertising is required. The ideal candidate will have a minimum of 3 years experience in planning and implementing regional user conferences with North America, establishing new regional user groups and supporting existing user groups, and participating in partner user events. Additional activities include developing and maintaining online forums regarding Progress and bringing customer feedback regarding customer requirements, company and product perception and reactions to new directions and programs back into appropriate corporate organizations. Excellent project management, organizational and communication skills, customer relationship experience, and event management experience required. 3 years marketing experience and experience in managing or implementing user programs preferred. Some travel required. E-mail resumes to hr@progress.com

Senior Channels Programs Marketing Manager

This individual will be responsible for working with global and North American channel partners in defining and implementing critical co-marketing programs. This individual will use his or her marketing experience to consult with partners on the most effective programs to benefit them and Progress. Design and develop new programs, provide guidance on how to successfully execute by partners, evaluate program performance. This individual will also be responsible for helping to develop strategic partners into top-tier accounts. Additional activities include participating in account planning and customer visits, managing the funding for co-marketing programs and bringing customer feedback into Progress marketing program management. Regional and communications skills, customer relationship experience, and event management experience required. 5-7 years marketing experience preferred. Some travel required. E-mail resumes to hr@progress.com

Progress Software offers a competitive salary, medical, dental, and life insurance, and a 401(k) plan. Unless indicated all positions are located at our Bedford headquarters. If you are interested in any of the above positions, please forward your resume to the appropriate e-mail address or send to: Progress Software, Human Resources, 14 Oak Park, Bedford, MA 01730; FAX: 781.280.4350.

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Systems Engineer Manager, Northeast Region

Working out of our Bedford office, this individual will have responsibility for the management of all technical presales activity for both Applicivity and Enterprise products. Primary responsibilities include the recruitment, supervision, training and mentoring of the Systems Engineers for the region. This individual will be responsible for you will have ultimate responsibility for the management of technical relationships with prospects and customers throughout the sales cycle. In addition, you will be responsible for the escalation and resolution of technical support issues for the customer base and you will act as a technical product resource and problem solver to management on behalf of the sales force. Qualified candidates will have an understanding of database products as well as the ability to communicate technical ideas to both technical and non-technical audiences. Must have previous experience as a systems engineer and strong communications skills. Previous management experience desirable, but not required. Travel required. E-mail resumes to hr@progress.com

Supervisor, Lead Management

Supervise a 6 member telemarketing team focused on inbound responsiveness and outbound calling generated by Marketing Campaigns. Duties include maintaining lead quality and ensuring appropriate lead distribution. Will monitor and evaluate the performance of the group, determine campaign planning and provide the appropriate strategic feedback to the Inside Sales Manager. Establish rapport with all Product units, Marketing and Sales Representatives. Must be a proactive member of the sales management team, willing and able to participate in customer care and prospect confirmation calls. Candidates will be responsible for coordinating and participating in product and sales training. Successful candidates will have 2 to 4 years experience supervising an inbound/outbound telemarketing function. Must be comfortable with technical and sales oriented experience desired. Considerable positive attitude and successful management capabilities are a must. BA/B.S. degree or equivalent business experience required. Occasional travel required. E-mail resumes to hr@progress.com

Sr. Product Manager/Database & Dataservers

As a senior level Product Manager for Progress Software, you will be directly responsible for defining, managing and delivering the strategy for our Core Database/Dataserver technology. You will work closely with Development and Team Product Managers to build and deliver the worldwide strategy, planning for the Progress RHIMS to our customer base. You will be responsible for defining the product requirements, will define and prioritize new product features and functional requirements, develop competitive and comparative analysis against related products and educate internal teams on all aspects of the product. BS/B.A. or equivalent experience /MBA preferred. 10 plus years' software development or product management experience. E-mail resumes to hr@progress.com

Product Manager/General Marketing Manager

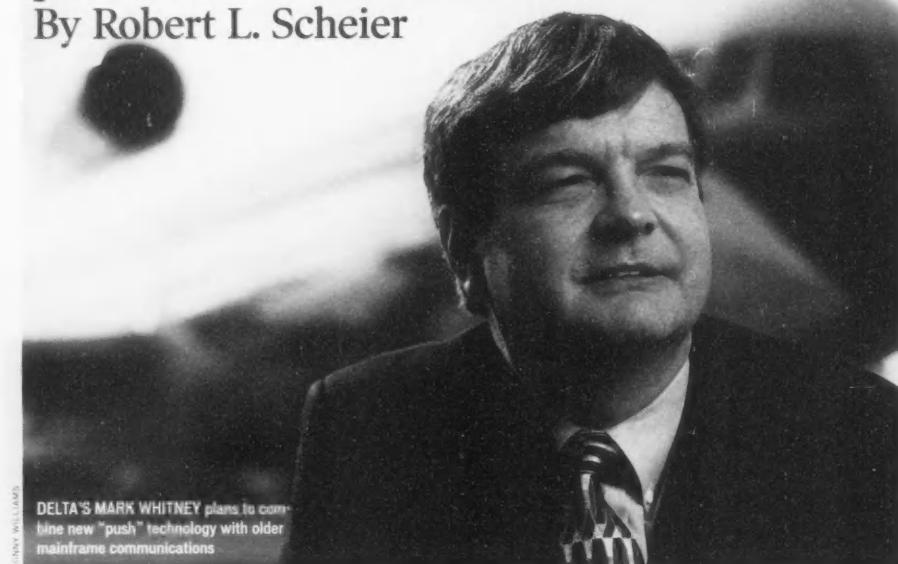
In this highly visible position, you will define the worldwide strategy planning for our major core product releases. In conjunction with Development, you will formulate worldwide product strategies around a number of specific product lines. Lead the marketing, internal training and engineering. Additionally, you will partner with the Program Manager to ensure a cohesive team delivery of the product. BS/B.A. or equivalent experience. Minimum 5 years' software development, product management experience. E-mail resumes to hr@progress.com

Credit Analyst

As a key member of our dynamic team, you will make daily collection calls, investigate new customers, prepare credit analyses and establish credit limits. You will also review customer accounts annually, reevaluate and process customer credit requests to determine maximum credit review and analyze monthly aging to determine account collectability and risk classification. To succeed in this vital role, you must have 2+ years' experience in credit, collection and accounts receivable, as well as excellent computer communication, negotiation and interpersonal skills. BA/B.S. or equivalent degree required. 1-3 years' experience with MFG/PRO preferred. E-mail resumes to hr@progress.com

For years, message-oriented middleware has let applications carry on simple chats. Now, Delta hopes dedicated message processors will elevate the conversation.

By Robert L. Scheier



SUNNY WILLIAMS

DELTA'S MARK WHITNEY plans to combine new "push" technology with older mainframe communications

MORE BETTER MESSAGING

FLying people around the globe is almost the easy part. Keeping track of whether there's a seat and a hot meal for them, without breaking the IT bank, is tough.

Delta Air Lines Inc. is tackling that IT challenge by rethinking how it uses message-oriented middleware, combining old-fashioned request-reply mainframe communications with "push" technology that automatically tells a gate agent when a last-minute passenger has bought his ticket or checked his bag.

"The goal is to move our agents from fighting the computer, typing in queries while a passenger waits, to the face-to-face, personal touch our customers expect," said Keith Halbert, vice president of the Customer Portfolio at Delta Technology Inc., the IT subsidiary of Delta in Atlanta.

Delta's middleware strategy is leading-edge for airlines; in fact, for any industry outside of Wall Street, said Gartner Group Inc. analyst Roy Schulte. Delta is using IBM's MQSeries to link applications, databases and translation software from different vendors, not just to link different modules within the same application. And while most customers use MQSeries for "as soon as possible" delivery, Delta pushes it "to exchange data within a matter of seconds."

The first public glimpse of this came over the Thanksgiving crunch at the Jacksonville (Fla.) International Airport, where Delta rolled out a new application designed to cut delays at check-in counters and gates. Delta said the application produced "very positive feedback," but it also showed the risks of pushing technology as Delta and IBM battled last-minute bugs. [See "Delta flies middleware beyond its expectations," CW, Dec. 7.]

Delta's core innovation, which it is codeveloping with Inrange Technologies Corp. in Shelton, Conn., is front-end processors that sit in front of older mainframe systems and make it easier and less expensive to use MQSeries to link to other applications.

"Delta has moved the boundaries" of messaging, said Colin Osborne, IBM's worldwide business executive for MQSeries in Hursley, England. "They are driving what is totally a real-time operational airline system."

Green Light at the Gate

Delta's new application in Jacksonville, for example, is fed by a database that in turn is fed by transaction systems of flight, passenger and ticketing data.

"These databases can, for example, push an alert to a gate agent as to how many passengers are actually checked

TECHNOLOGY

in on the airport property. With this proactive information, the agent knows how many waiting standby passengers can be accommodated on the flight, without having to type in a query," said Mike Childress, director of the gates and boarding department at Delta Technology.

Delta doesn't want to bog down its core transaction processing systems — which handle 1,000 transactions a second — with updating a database every time a passenger steps on an airplane. Message-oriented middleware such as MQSeries is a logical choice to handle that because it doesn't require expensive, continuous links between the sending and receiving of applications. Instead, messages are stored in queues at the sending and receiving processors, which process them when ready.

But airlines historically have had to build their own messaging middleware because of their heavy message volume and need for very high availability and fault tolerance. Rather than pay a staff of 12 to maintain VECTR, which it uses to send messages from its MQSeries systems to distributed, less-expensive NT and Unix client/server systems, "we would rather buy something off the shelf," said Craig Carter, manager of Transaction Processing Facility (TPF) access at Delta Technology.

It's also expensive to adapt mainframe applications to support MQSeries, to build interfaces between proprietary middleware and MQSeries (see chart) and to shut down mainframe systems to adapt them to changing needs. Delta's reservation system, for example, uses IBM's TPF, which gives very high-performance but is difficult to link to any off-the-shelf software, said Neil Unger, director of emerging technologies at Inrange.

The new front-end processors will, if all goes as planned, make it easier, quicker and less expensive to link legacy applications to MQSeries, says Mark Whitney, a principal at Delta Technology. That's because the processors will look to the mainframe like a normal storage device. By the third quarter of this year, Inrange hopes to begin testing the capability to dynamically route messages around inoperative or busy servers. Delta also plans to use third-party tools to allow the processors to translate messages from, say English to French or EBCDIC to ASCII and to apply business rules to the messages.

How It Works

Inrange's front-end processor, to be called the MD 9000, is an intelligent I/O control unit comprising rack-mountable Intel-based processors, said Michael Ruggieri, Inrange's vice president of business development.

The controllers link to mainframes using standard Escon and, eventually, Fibre Channel links and links to LANs and WANs via Fast Ethernet. The controllers run NT or Windows 2000 as a runtime environment, but neither the hardware nor the operating system can be accessed by users, and the MD 9000s can't be used to run anything but the MQSeries control software.

Because multiple mainframes can grab a unit of work, users can "throw more horsepower" at a job.

MICHAEL RUGGIERI, VICE PRESIDENT OF BUSINESS DEVELOPMENT AT INRANGE

By the middle of this year, Inrange is scheduled to give Delta a controller that appears to a TPF mainframe to be a 3490 tape drive, but actually uses output from the mainframe to populate inbound and outbound MQSeries queues. Hopefully before the end of 1999, "but certainly in the year 2000," Ruggieri said, Inrange will support the far wider market of MVS mainframe applications. At that point, he said, any legacy program that can accept input from a tape drive can "be message-enabled, and you don't have to rewrite

those applications to the MQSeries application programming interface."

Putting the control logic in the front-end processors should also make it easier to reconfigure systems on the fly, compensating for changing message loads and business requirements. If Inrange can dynamically reroute messages from one queue to others, any one of "multiple mainframes can go out and grab a unit of work," Ruggieri said, letting a customer "throw more horsepower dynamically at your particular job."

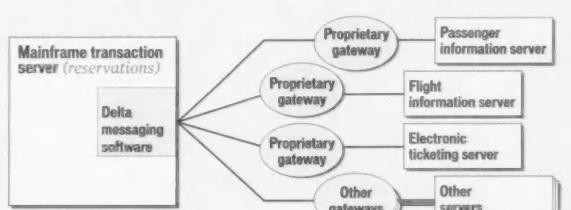
At least for now, not everyone needs or can afford these traffic cops for messaging, which will cost between \$50,000 and \$1 million, depending on capacity. That doesn't count the unspecified amounts Delta is spending to codevelop them. The opportunity for Inrange — and the impact for customers — will be greater if Inrange can move beyond the rarified TPF market of banks, airlines and the like into more common mainframe operating systems.

"If you have a stable product in the TPF environment, [it lets] us step into an MVS or VM customer site," Ruggieri said. "It's like, 'If you can make it in New York, you can make it anywhere.'"

Scheier is Computerworld's technology editor. His E-mail address is robert_scheier@cw.com.

Lines of Communication

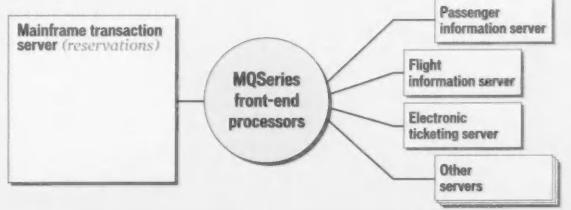
Current: Delta programmers must write custom gateways between proprietary messaging software and off-the-shelf middleware (IBM's MQSeries) to push customer service information to gate agents and others.



"The goal is to move our agents from fighting the computer... to the face-to-face personal touch our customers expect."

KEITH HALBERT, VICE PRESIDENT OF THE CUSTOMER PORTFOLIO AT DELTA TECHNOLOGY INC.

Planned: Delta will use front-end processors to allow any MQSeries-enabled platform to look like a mainframe tape drive. Eventually, Delta will use these processors to translate data and to route messages among processors.



TECHNOLOGY

50 YEARS OF TECHNOLOGY INNOVATION • 1950-1999

Genesis of the Computer

Flashback looks at the past 50 years in computing, highlighting a different year each week in chronological order, starting with 1950.

BY LESLIE GOFF

In 1950, the computer industry was only 4 years old. But the patterns that would define the new industry already were settling into place: the accelerated rate of change, the entrepreneurial start-ups, the battles between the visionaries and the businessmen, the intense competition to be faster, smaller, cheaper. The activity of the nascent industry of 1950 bore a striking resemblance to today's more mature industry.

As further evidence of the industry's growing influence, *Time* magazine featured an anthropomorphized computer on a cover, along with the question, "Can man build a superman?" Only four years earlier, the first electronic computer, the ENIAC (Electrical Numerical Integrator and Calculator) had been unveiled. In 1950, a small company in

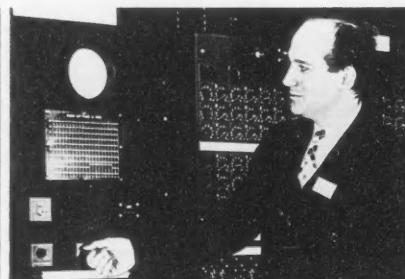
Philadelphia, launched by the ENIAC's inventors — J. Presper Eckert and John Mauchly — was well on its way toward completing a new, faster computer called the Univac (Universal Automatic Computer). It would use magnetic-tape storage to replace punched data cards and printers to list the content of the tape.

Within two short years, *Univac* would become synonymous with computer the way Kleenex is synonymous with facial tissue. But just as Eckert and Mauchly's company, EMCC, was on the verge of success in 1950, with three customers lined up and development nearly finished, it found itself in trouble. The tale of the fledgling firm's fate contains some details that would reappear many times in the industry. Most notably, the two men were hurt by a lack of business skills. Moreover, they lost their main financial backer in a plane crash.

Eckert, named in 1982 by the Institute of Electrical and Electronics Engineers Inc. as the engineer of the century, was clearly the engineering muscle behind the ENIAC and the Univac. But Mauchly was the visionary, the dreamer who in many ways foreshadowed the Silicon Valley visionaries who were to follow 30 years later.

"Mauchly was the kind of guy who thought with his mouth open," says his widow, Kay Mauchly Antonelli, who became one of the world's first computer programmers when she worked on the ENIAC ("Mothers of Invention," CW, Nov. 16). "He was at the forefront of ideas about machine language. He was a dreamer."

The military drove the development of the earliest computers such as the ENIAC, seeking faster, more accurate ways to perform mathematical and scientific calculations. Mauchly was among the first to



In 1950, ENIAC inventors J. Presper Eckert (pictured) and John Mauchly sold their company to Remington Rand

see the computer as more than a high-powered calculator. He envisioned general-purpose computers that could be employed to solve a variety of business problems.

But Mauchly was an idea man, not a businessman. After EMCC lost its backer, American Totalisator Vice President Henry Strauss, near the end of 1949, it was forced to court suitors who might acquire the firm.

So in early 1950, it set up a meeting with Thomas Watson Sr., president of IBM. Not long before — some time in 1949, as the story goes — Watson had dismissed the notion of computers, asserting that all the world would ever need would be about a dozen of them. By the time Eckert and Mauchly showed up, Watson

MOREONLINE

Kay Mauchly Antonelli, John Mauchly's widow, reflects on his life. www.computerworld.com/more

Univac for the U.S. Census Bureau. He resigned his position and took a job in another Remington Rand facility.

"1950 was a bad time for us," Antonelli says. "[Mauchly] had to fight for two years to clear his name, and he was finally cleared. But in the meantime, the company lost all of its contracts. His integrity and name were at stake. And after two years, when he was allowed to go back to EMCC, Remington Rand would not make him president again."

Nevertheless, his legacy lingers as a man whose willingness to dream and ability to inspire helped set the pace and direction for a new industry. ▀

Goff is a regular contributor to Computerworld.

Technology Advances:

Claude E. Shannon publishes *Programming a Computer for Playing Chess*, initiating the long history of chess-playing computers.

The American military begins using computer simulations in its war games.

Bell Laboratories' K. H. Davies builds the first machine able to recognize 10 numbers spoken by a human voice.

Yoshio Nakamatsu invents the floppy disk at Tokyo's Imperial University.

Engineering Research Associates delivers the ERA 1101, the first commercially produced computer.

Edmund Berkeley publishes *Computers and Automation*, the first computer magazine.

February: Wisconsin Sen. Joseph McCarthy begins lobbing charges of communism in the U.S.

June: U.S. declares war on North Korea.

September: Color television introduced in the U.S.

November: Richard Nixon elected U.S. senator from California.

Born in 1950:

- Mitch Kapor
- Clifford Stoll
- Steve Wozniak



Facts:

1.5 million television sets in the U.S.

U.S. military budget: \$12 billion

Cost of a 1950 Ford Crestliner: \$1,424

Cost of a 1950 Ferrari 166 MM: \$10,000

Cost of a movie ticket: 50 cents



1950 TIME INC. REPRINTED BY PERMISSION

SOURCES: FORD MOTOR CO., FERRARI; AUTOMOBILE ASSOCIATION OF AMERICA

PROFESSOR WARWICK CHIPS IN

The first human with a microprocessor implant used it to open doors and turn on lights. Was the experiment a harbinger of the future or just a Clapper upgrade? By Sam Witt

IS THE HUMAN BODY a fit place for a microchip? The debate is no longer hypothetical. The same computing power that once required an entire building to harness now can be inserted in your left arm. Better yet, somebody else's left arm.

Professor Kevin Warwick, director of cybernetics at the University of

Reading in the U.K., is that somebody else. On Monday, Aug. 24, 1998, Warwick became the first human to host a microchip. During a 20-minute medical procedure described as "a routine silicon-chip implant" by Dr. George Boulos, who led the operation, doctors inserted into Warwick's arm a glass capsule not much bigger than a pearl.

Continued on page 90

OPEN SESAME:
The microprocessor implanted in Kevin Warwick's left arm switched on his PC and reportedly drew him a bath.



Continued from page 89

The capsule holds several microprocessors.

The British Broadcasting Corp. was on hand to document the historic event — and to trouble the professor's already frayed nerves. "In theory, I was able to see what was going on," Warwick says in a phone interview several days after the operation (which he described as slightly more pleasant than a trip to the dentist), "but I was looking in the opposite direction most of the time."

Although Warwick winces at the comparison, Boulos likens him to a latter-day Edward Jenner, who injected himself with cowpox in 1776 to further his research into a smallpox vaccine.

"The doctor pinched the skin and lifted it up and sort of burrowed a hole ... underneath the skin and on top of the muscle," Warwick says. "It's well inside my body, in my left arm, just above my elbow. [It's] held in place by three stitches — partly so that the wound is held together, but also so that the capsule doesn't float around anywhere."

Though he declines to reveal the chip's manufacturer, Warwick did disclose that it's a "commercial" product. "For obvious reasons, both positive and negative, they didn't want us shouting about what the name of the exact product was," he says.

The approximately 23mm-by-3mm device stayed in Warwick's arm for only nine days — partly to avoid medical complications, partly because it was fairly limited in power. "Half of it is an electric coil,"

Warwick says, "and half is a number of silicon chips." The chips used only eight of an available 64 bits of information to communicate with the University of Reading's intelligent building.

Which brings us to the question: Why?

Warwick has spent more than 20 years researching and developing intelligent buildings. "In our building in the Cybernetics department, we've got quite a number of doorways rigged up so that they pass a radio signal between the door frame," he says. "When I go through the doorways, the radio signal energizes the coil. It produces an electric current, which the chips use to send out an identifying signal, which the computer recognizes as being me."

And so, for a little better than a week, doors that normally require smart cards swung open for the professor. A system of electronic nodes tracked his movements throughout the building. Lights blinked on when he entered a room.

"Hello, Professor Warwick," his PC announced when Warwick crossed the threshold of his office, before casually mentioning how many E-mail messages he had received.

It also was reported that Warwick used the device to run a bath and chill his wine.

How did he like it? "In my building I feel much more powerful, in a mental way," Warwick says. "Not at one with the computer, but much, much closer. We're not separate. It's not as though we're good friends or anything. But certainly when I'm out of the building, I feel as though part of me is missing."

Asked if he named his chip, Warwick laughs. "I don't see it as a separate thing," he says. "It's like an arm or a leg."

Warwick's family was a little slower than his body to accept the chip. "My wife finds it really strange," he says. "She didn't want to go near my arm for a couple of days. It was as though I had some funny disease." His 16-year-old daughter reportedly called him "crazy."

And the day after the operation, Warwick played a game of squash with his son, but not before issuing a stern warning: "Whatever you do, don't hit my arm. The implant could just shatter, and you'll have ruined your father's arm for life."

Real-World Applications

Though the experiment sounds like an episode of *Dr. Who*, real-world implications are "right around the corner," says Warwick, who foresees enormous medical applications. Through a system of embedded chips interfacing with an artificial motor system, Warwick imagines paraplegics walking.

And that's just for starters. "Simply take measurements off muscles and tendons and feed them into the transponder," Warwick says. "That means, ultimately, that you wouldn't need a computer mouse anymore. You wouldn't need a keyboard."

Charles Ostman, a senior fellow at the Institute for Global Futures and science editor at *Mondo 2000*, agrees. "Neuroprosthetics are ... inevitable," he says. "Biochip implants may become part of a routine medical procedure. After that, interface with outside systems is a logical next step."

Warwick's eagerness is palpable, engaging, contagious. "This is where you can speculate," he says. "This is where we take a technical thing and say, 'Right-o, got the signal, got the implant; all I've got to do is run a wire from the implant to my nervous system.' ... I'm so excited about it, I want to get on with the next step straight away. Let's see if we can control computers directly from our nervous system."

Not everybody is as avid, of course. In a world in



[I'M] NOT AT ONE WITH THE COMPUTER, BUT MUCH, MUCH CLOSER . . . [BUT] IT'S NOT AS THOUGH WE'RE GOOD FRIENDS.

KEVIN WARWICK

DIRECTOR OF CYBERNETICS, UNIVERSITY OF READING

which cloning already is a reality, the microprocessor implant gives rise to more staggering ethical questions. "There was a discussion on the radio Saturday morning [after the operation]," Warwick says, "that pedophiles be implanted with a thing similar to what I've got in me, so that if the person goes toward a school, alarms sound."

Reactions to the experiment have ranged from enthusiasm to fear to disbelief. The day after the operation, Warwick received several invitations to appear on variety shows in the U.K. and France. He declined, though he did make a brief U.S. appearance via telephone on ABC's *Good Morning America*.

Warwick has received outraged E-mail from what he calls "the very strong end of the Charlton Heston lobby" at suggestions made by radio pundits that gun owners be embedded to prevent anyone else from using their firearms. Articles and talk shows from London to Des Moines to Oslo have buzzed with ethical hesitation from people of all manner of political and religious beliefs.

Not everybody shares this hesitation. In addition to encouragement from his scientific colleagues, various envoys from the chip industry have been in touch. "The latest count is 23," Warwick says, including "one particular company, a very large one, not too far from where you're sitting."

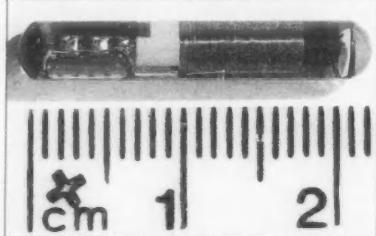
The reporter was sitting in San Francisco. Warwick declined to be more specific. An Intel Corp. spokeswoman wouldn't verify any contact with Warwick.

The implant experiment has brought millions of dollars in corporate research money to the cybernetics department at the University of Reading. Part of Warwick's motivation may have been to attract more financial assistance to the school.

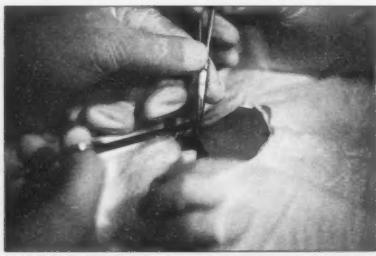
But mostly, the professor seems motivated by good, old-fashioned scientific curiosity, though at times Warwick's perspective on his historic experiment seems oddly gloomy. For instance, when asked about one suggestion making the rounds — that dog owners in France implant their pets with microchips to keep track of them — he says: "I mean, maybe I know how some of the dogs feel. That's all."

Witt is a freelance writer in San Francisco. His Internet address is toomany@sirius.com.

INTEL INSIDE?



The approximately 23mm-by-3mm device stayed in Warwick's arm for only nine days — partly to avoid medical complications. During those nine days, doors swung open for the professor, and electronic nodes tracked his movements through his offices

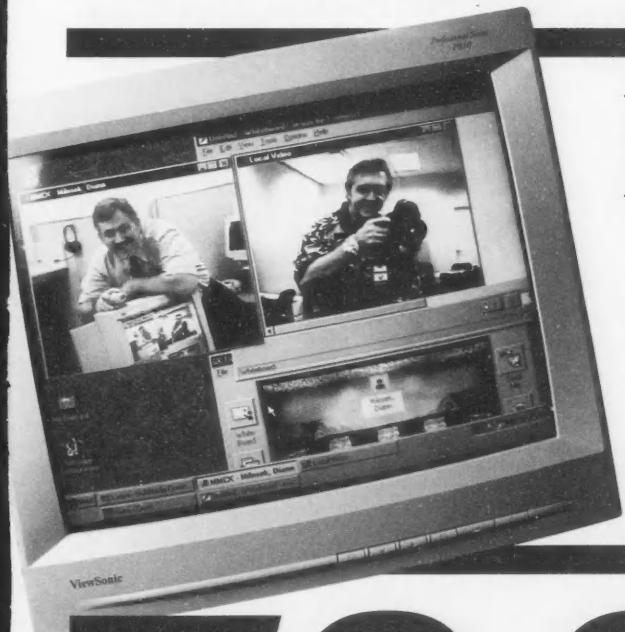


During the "routine silicon-chip implant" operation, doctors burrowed a hole in Warwick's left arm and inserted the device on top of his muscle, just above the elbow. Warwick could have watched the procedure, but he chose to look the other way most of the time

PHOTO PROVIDED BY INTEL GROUP

Companies now find videoconferencing a more viable alternative to meeting in person By Kevin Burden

COMING INTO



DON'T BUY a videoconferencing system to save money in the travel budget. Users say the savings are small. But if you want to improve face-to-face communications and keep employees happy, the investment pays off big-time.

More companies use videoconferencing now that it's more affordable and backed by standards. Benefits include access on the desktop, training, involving more people in meetings and improving employees' quality of life by letting them stay at home more often.

But there are challenges. To use a telephone analogy, we have a dial but are nowhere near Touch-Tone. Here's a look at how five firms use desktop videoconferencing and why they chose the vendors they did.

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FOCUS

Lockheed's Wynn Jones: "Things like raising an eyebrow when you don't understand something — that gets lost in conference calls."



Continued from page 91

Aerospace

Products used: Lucent's MMCX desktop videoconferencing server; Microsoft's NetMeeting

Goal: Production of Joint Strike Fighter requires face-to-face collaboration

Lockheed Martin Tactical Aircraft Systems in Fort Worth, Texas, wants everyone involved in the production of its new Joint Strike Fighter working as if they were side-by-side. Actually, its testing methodology requires it.

Lockheed uses the Fagen inspection program, which involves four people conducting formalized walk-throughs designed to detect defects in software and its documentation as early as possible. But because the Fagen system calls for the players to be face-to-face so that facial expressions and body language can be recorded, Lockheed had to create a virtual enterprise for its geographically dispersed team members.

"Nonverbal communication is critical to this inspection process," says Wynn Jones, engineering specialist. "Things like raising an eyebrow when you don't understand something — that gets lost in conference calls."

Lockheed chose the MMCX desktop videoconferencing server from Lucent

Technologies Inc. in Murray Hill, N.J., for many reasons: foremost for its application sharing, which is handled through Microsoft Corp.'s NetMeeting. With it, team members can work together in shared applications, passing documents back and forth while talking in full duplex mode. The system connects Lockheed's Fort Worth campus with its divisions in Marietta, Ga., and Palmdale, Calif., and will soon connect to British Aerospace in the U.K.

Image size and quality were also priorities, because it was important for workers to clearly see facial expressions. But Lockheed needed to decide how far back from broadcast quality would be acceptable, because the 30 frame/sec. needed for real-time video wasn't possible on its 10Base-T network. "We found that a frame rate about half that of real time was acceptable for us," Jones says. But Lockheed is upgrading its network to a Category 5 cabling. Although 15 frame/sec. is workable, Lockheed wants it to be better.

Aside from the Fagen inspectors, engineers will likely benefit the most because they are seldom selected to travel to off-site meetings, according to Jones. "Not only are we now involving more workers who should've been in these meetings all along, but the system is helping us reduce the risks normally associated with multisite development projects." For instance, the later a defect is found in the development cycle, the more costly it is to fix. "Because we can now have impromptu live meetings, we expect to find more defects

SNEAK PEEK: INTEGRATION, COST CUTS KEY

BY CHRISTINE PEREY

It isn't perfect, but desktop videoconferencing has come a long way from the technowizardry research-and-development lab days to what it is today: a set of stable and interoperable hardware and software technologies tightly knit together through a graphical user interface. Products are more mature than ever, but fewer than 1 million people use personal videoconferencing. Forward Concepts, a market research firm in

Tempe, Ariz., estimates that by the end of last year 41% of the 830,000 desktop videoconferencing systems worldwide were in business environments.

When market researchers and vendors have asked users and prospective users what needs to be addressed to make desktop videoconferencing attractive to a critical mass of users, the replies have led manufacturers to press forward in three key areas: applications, networking and cost. Users want tight

integration of video in mainstream applications such as Microsoft Corp. Office or Lotus Development Corp. Notes and options on deploying desktop videoconferencing such as through IP. And users want to do all that at the lowest cost possible.

Price trends: Costs for desktop videoconferencing are falling rapidly because of the availability of faster, lower-priced processors and the way the application uses the computer's CPU for

low-level tasks such as decompressing video and audio data. Expect to pay approximately \$500 for the add-on kit to upgrade a PC that already has the necessary network connections. According to Forward Concept, that will fall to approximately \$200 per seat by 2002.

How much will a business need to budget on an annual basis? It depends. Anywhere from \$1,000 to more than \$3,000 annually per system. Total cost of ownership must be addressed for desktop videoconferencing to go mainstream. In general, the

cost of infrastructure components drops (on a per-user basis) when a critical mass of users is deployed. One component, the cost of using a telecommunications network for long-distance connections, remains the highest persistent budget item associated with desktop and room videoconferencing applications.

But when compared with the cost of transporting a valuable expert or executive, the business justifications may be made.

Other factors: Aside from the continuous stream

TECHNOLOGY FIELD REPORT

sooner than if we were working through conference calls," Jones says.

Attending meetings from your desktop is also just convenient. "When you meet in a conference room, you try to take everything you need with you. But your desktop is your power base; there is nothing to forget since everything is right there," Jones says.

Communications and energy

Products used: CorelVideo
Goal: To improve employees' quality of life

At the Williams Cos. in Tulsa, Okla., desktop videoconferencing is as much about improving employees' quality of life as it is about improving communications.

With more than 20,000 employees scattered among its numerous companies, such as Williams Pipeline and Williams Metro Gas, travel is a major part of its corporate life. But instead of counting on videoconferencing to save money in the travel budget, the powers at Williams saw a greater benefit in boosting the morale of its employees.

"Travel is hard on you. Now it's stay at home, be with the family and still participate in meetings across the country as though you were right there," says Walt Banfield, manager of research

and technology at Williams Conferencing in Denver, the division responsible for setting up videoconferencing throughout Williams.

Williams has used videoconferencing rooms, video-equipped auditoriums and satellite technology for years. But because that technology is so expensive and was constantly tied up, it couldn't benefit all who wanted to use it, Banfield says. So for \$1,500 per seat, Banfield began installing Corel Computer Corp.'s CorelVideo to desktops at broadcast quality within the building and half that of broadcast when connecting to the outside.

Williams has about 100 desktop systems installed, and the video runs over two unused wires in the company's LAN, so it essentially has its own dedicated network within the buildings, Banfield says. A bank of coder/decoder cards on the LAN delivers the broadcast quality so users can watch TV channels set up for them, such as Cable News Network and CNBC Business News. "Users can even switch to the security camera in the lobby to watch for their guests," he says.

When conferencing outside the buildings, video is sent through a gateway and onto Integrated Services Digital Network (ISDN) lines that deliver about 15 frame/sec. "Which is all you really need for videoconferencing," Banfield says.

But as valuable as two-way video is, Banfield expects CorelVideo's play-back-on-demand feature to be just as useful. "Anyone who missed our presi-

dent's address can go to the archiver and play it back when they want," he says. "Even training videos, pick a course, and it streams the video to you."

Energy company

Products used: Intel's ProShare, PictureTel's Concorde room system, Microsoft's NetMeeting, PictureTel's LiveShare
Goal: Global company needs to share expertise for specific events

Atlantic Richfield Co. (ARCO) started to install videoconferencing systems in the early '80s because, like many global companies, its expertise isn't always where it needs to be when events occur.

Back then, there were only large proprietary conference room systems, and ARCO had one in each of its major sites around the world. "Improve communication — that was their sole purpose," says Richard Barclay, a network consultant at ARCO. There were minor considerations to the savings in the travel budget, "but improving face-to-face communication is the only way to truly justify videoconferencing. Try to justify it financially, and it rarely seems like a good deal," he says.

Improving face-to-face communication is the only way to justify videoconferencing.

RICHARD BARCLAY,
NETWORK CONSULTANT, ARCO

Since then, ARCO has further grown its global presence, and videoconferencing is more affordable and on the desktops at ARCO. Still, "focus only on the financial return on the investment, and it won't work," Barclay says.

Desktop video is available to anyone at ARCO willing to pay for it — about \$1,000 per user, Barclay says. About 100 Intel Corp. ProShare systems are in place. "We went with Intel because its application sharing is better than the PictureTel [Corp. desktop] system we evaluated," Barclay says, despite already having upgraded ARCO's room systems to PictureTel Concorde.

Intel uses Microsoft Corp.'s NetMeeting to share applications, which is common to a variety of desktop videoconferencing systems. PictureTel uses its own product called LiveShare, and it's a lot of work getting the desktop and room systems to talk to each other, according to Barclay. So much work that ARCO doesn't bother with application sharing between its desktop and room systems. Instead, the two systems are

Continued on page 94

of network upgrades, maintenance and management considerations, other components of annual video application ownership cost include:

Cost of training the users with the new features of their existing applications.

Cost of transmission or transport associated with large media files/streams.

Cost of supporting "natural" meeting processes, such as multipoint calls and internetworking gateways for ISDN and IP terminals to communicate.

Leaders: There are dozens of companies with desktop videoconferencing products on the market, but the desktop videoconferencing industry is dominated by a small number of companies.

Intel Corp. is the undisputed leader in terms of 1998 unit shipments, according to Forward Concept. Intel attained that position through innovation and by leveraging the company's brand recognition. Going forward, Intel has the opportunity to increase its market share by providing a full set of IP-based (H.323-compliant)

network components that will work best with Intel videoconferencing end points.

Three other vendors in the desktop videoconferencing space merit mention. **VCON Ltd.** is charging to the desktop with a low-cost add-on kit. The company's recent initial public offering provided the cash infusion necessary to sustain its advanced research in H.323 and expand its marketing partnerships, including those with networking companies such as Cisco Systems Inc.

PictureTel Corp., the market leader in terms of annual revenue in group video sys-

tems, has gradually lost market share in the desktop space. But recent engineering and manufacturing agreements with another industry leader, **Zyadron Inc.**, are beginning to yield results in the desktop product line. One of PictureTel's crown jewels today is its ability to provide a soup-to-nuts approach to large videoconferencing deployments. The company offers systems of all sizes.

Zyadron is a well-established H.320 desktop add-on kit provider. Its focus on high-quality manufacturing and providing a superior

video and audio experience for users has made it the solution of choice for kiosk-based applications.

Perry is president of Perry Research & Consulting in Placerville, Calif., which provides strategic business development consulting services to the multimedia networking industry (www.perry.com). Perry co-authored "Teleconferencing Markets and Strategies: The Road to Multimedia Communications" (www.forwardconcepts.com) and "Networked Multimedia in Business," market research reports. She can be reached at cperry@perry.com.

Continued from page 93

run in parallel in the conference rooms. The room systems handle the video, and application sharing is handled by a ProShare system.

Also, ProShare systems run on either ISDN lines or over IP networks right out of their box. ARCO generally uses the ISDN option because it allows users to talk to business partners who also have videoconferencing installed, but sometimes the high cost has them experimenting on the IP side. In Alaska, where ISDN lines can run \$160 per month, ARCO has beefed up its regional wide-area network to run ProShare over IP. Video quality can suffer if the network isn't ready to handle it. "But over a fast network that you can control, you can actually improve the quality over what you would get from ISDN," Barclay says. And through an IP gateway to an ISDN line, Alaskan users still have access to the rest of the world.

ARCO also added a multipoint conference server called MeetingPoint from White Pine Software Inc. in Nashua N.H., so its users can set up ad-hoc group meetings. "Typically, multipoint vendors want 24-hour notice and charge \$50 per hour per port for such meetings. Now our seismic and drilling experts around the world can hold impromptu meetings," Barclay says.

MeetingPoint doesn't have all the features multipoint vendors deliver, such as continuous presence where everyone in the meeting remains on screen together. But it puts the meetings in the control of its users, which Barclay says is more valuable.

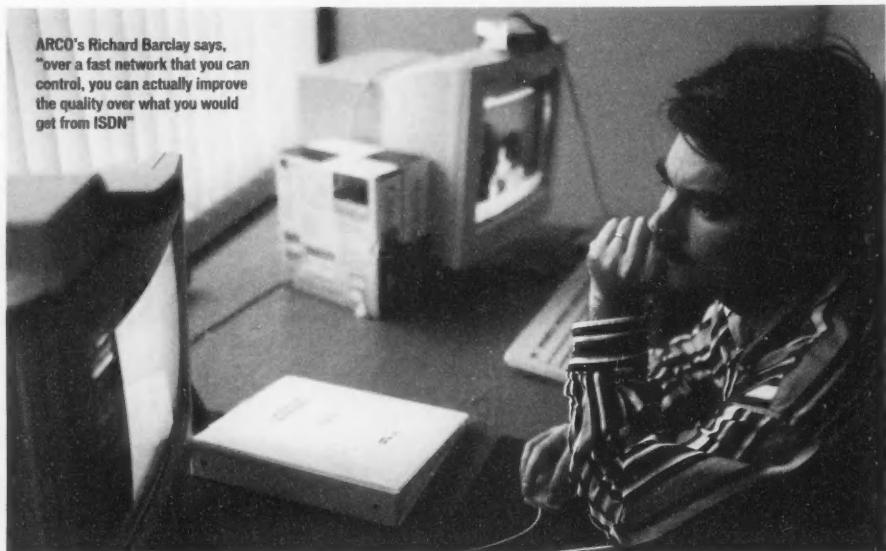
And aside from having more hardware and software to manage, "user support is the biggest challenge we faced," Barclay says. "[Videoconferencing] isn't something they use every day, so there is a lot of hand-holding." Users also needed to be trained in some of the softer skills of being team members. "When you're communicating with people you've previously only talked to over the phone, you have to be a little more conscious of what your body language is saying," Barclay says.

Education

Products used: PictureTel's Concorde, Intel's ProShare, V-Tel's TCI000 Lucent's MMCX
Goal: Distance learning

The University of Maryland in College Park has been using videoconferencing for distance learning during the past 10 years. And until recently, all of its systems, including the large rooms, desktops and rollabouts, were based on the

ARCO's Richard Barclay says,
"over a fast network that you can control, you can actually improve the quality over what you would get from ISDN"



H.320 standard for videoconferencing over phone lines. The university is adding IP-based systems that work on the newer H.323 standard. "Now the fun begins," says Clay Gump, systems administrator at the university.

The problem is that the new IP-based systems are as immature as the H.320 phone line systems were five years ago, according to Gump. "Back then, there was always the danger that the V-Tel system you just bought wouldn't work with the PictureTel you already had. That is no longer the case now that H.320 systems have matured," he says. And so far, that hasn't been the case with the new IP systems, but the H.323 standard was ratified only a year ago, so there are plenty of applications on the market that don't work well together.

For professors who want to teach or students who want to attend classes remotely, the PictureTel, Intel ProShare and V-Tel systems on campus have worked fine. Particularly because the university's dedicated statewide fiber network gives stellar video quality to all of its campuses.

But Gump started installing Lucent's MMCX systems because the new Internet-based systems have an edge in collaboration over the older H.320 standard: "Giving control of your mouse to another conferee or letting them see what is on your screen. That is built in to H.323 but isn't in H.320," Gump says. So far, the collaboration capabilities have been most useful to research groups and their work with other universities and government agencies.

When evaluating IP-based desktop systems, Gump advises that buyers pay particular attention to the video quality delivered for the money, "since most of

the features among desktop videoconferencing systems are very similar." Video quality depends on the bandwidth of the network and the conferencing system itself. And good quality requires high bandwidth at both ends of the connection, so Gump says to be sure the system's video is acceptable when connecting to a low-speed user.

All systems can be boosted to broadcast quality by installing coder/decoder (codec) cards into the computers. The codec takes all the video processing on to itself, which frees up the computer's processor. But those who ask for codecs at Maryland typically have never done videoconferencing, Gump says. "Once they try it without the codec, they typically stop asking for it."

general manager of Ensure Computing Inc. in Norcross, the integrator of ACE's system. There are only so many quality instructors in the disciplines ACE teaches, and videoconferencing is the only way ACE can give all its members access to them, Walters says.

ACE tested an Intel ProShare system, but it has intolerable limitations such as no continuous presence. The video either would switch to whomever was talking, or it could be fixed solely on the instructor, which wouldn't work in the type of interactive training ACE wanted to do. Its price was also too high for ACE, because it would be furnishing all its members with systems.

ACE decided on White Pine Software Inc.'s MeetingPoint conference server with its CU-SeeMe Internet video chat software because it had the right mix of features for its all-important price point. It's capable of showing up to 12 endpoints simultaneously and accepts and mediates different endpoints, so users already on other systems such as ProShare or PictureTel can join in. It also runs over IP networks so contractors can connect over the Internet without the expense of an ISDN line. "Its video quality doesn't compare with the ProShare system we tested, but for less than \$1,000 a seat, it was suitable for our needs," Walters says.

Today, ACE contractors take classes at least once per week on ACE's training network. "It works because there is no travel involved, so contractors don't have to give up much of their revenue-generating time," Walters says. The network is also used in a true videoconferencing setting where contractors meet each month online to discuss issues affecting their businesses.

Contractors association

Products used: White Pine's MeetingPoint, CU-SeeMe Internet video chat
Goal: National training

Desktop videoconferencing typically helps companies communicate better. For others, such as American Contractors Exchange (ACE) in Norcross, Ga., it's the reason they exist.

ACE is a national network of independent plumbing and HVAC contractors, which has made a business out of providing technical and business training through desktop videoconferencing to its members. "Without videoconferencing, it would be impossible to run a business like ACE," says Bob Walters,

TECHNOLOGY EXEC TECH

Picture (IP) Imperfect

BY DAVID ESSEX

VIDEOCONFERENCING has been delivering on its promise for more than a decade with workhorse systems that cost tens of thousands of dollars, used Integrated Services Digital Network (ISDN) lines and had a quirkiness that required frequent attention. Because of the high cost, it hasn't been widely dispersed.

That picture started to change three or four years ago with the dawn of the Web and the spread of its Internet Protocol (IP). Today it's an IP world, and most companies have an internal IP network that can run an emerging class of low-cost IP cameras, video cards and software.

Worldwide standards are emerging to guarantee that proliferating conference-capable desktops will talk to one another. H.323 is the key stan-

dard: It tells any IP device (including network routers and gateways) how to compress and transmit audio and video over a network that wasn't designed for it. The vision is a world in which small corporate teams can talk to and see one another and share their work without leaving their desks — regardless of

the distance between them.

But IP conferencing is too immature a technology to achieve its potential just yet. H.323 is neither widely nor consistently implemented. The Internet is too small a pipeline to handle the demands of TV-like video, as are many corporate networks (Internet 2 and more Asyn-

chronous Transfer Mode and frame-relay WANs should address that problem). Tests show that videoconferencing suffers from the "plug-and-pray" installation nightmares that we thought disappeared with the Bush administration. I tested three representatives of affordable, corporate-class IP videoconferencing.

In the coming year, expect to see improvements on all videoconferencing systems — especially low-end notebook setups — and stand-alone IP devices that combine the camera, board, modem, microphone, speakers and software in one package. More vendors are likely to introduce fully H.323-compliant systems that work better with other vendors' offerings.



INTEL PROSHARE VIDEO SYSTEM 500

Intel Corp.
www.intel.com
\$799 (suggested retail price)

ProShare and LiveLAN are a combination of Peripheral Component Interconnect cards, camera, headset and software. But they dif-

fer in two big ways: ProShare can connect over LANs and ISDN, and it relies more heavily on high-end Intel Pentium II processors. LiveLAN off-loads those functions to the card, which PictureTel says improves performance. Intel says its CPU-centric approach lets users improve performance by upgrading the chip.

Like most desktop products, ProShare comes with collaboration

software (Microsoft Corp.'s popular NetMeeting) for sharing applications, chat, marking a whiteboard and transferring files. It took four hours on the phone with Intel to get a "stable" system.

Despite potential setup problems, ProShare is a viable solution — especially for companies with a mix of ISDN and LAN connections and a large base of Pentium IIs.



CU-SEEUME 3.12

White Pine Software Inc.
www.wpine.com
SI49

CU-SeeMe works with a host of cameras such as Logitech's popular Connectix. I installed it on Compaq Computer Corp. Armada 7400 and Gateway Solo 2500SE notebooks and a Pentium II desktop with Kodak Corp. DV323 and Xirlink C-It Universal Serial Bus (USB) cameras. That's when I discovered the sorry state of USB adoption. In fairness, I had the best luck with C-It, but the Kodak software seemed dumb about my system.

CU-SeeMe lacks application sharing and its video isn't as good as ProShare and LiveLAN. To get full H.323 functionality, including multi-point conferencing, you need White Pine's MeetingPoint software. The sound was roughly comparable to that of LiveLAN and ProShare.



LIVELAN

PictureTel Corp.
www.picturetel.com
SI195

LiveLAN mimics ProShare but offers more heavy-duty conferencing features, such as the 330 NetConference server for eight-point conferences (\$12,995) and links to PictureTel's higher-end systems. On the downside, LiveLAN lacks built-in ISDN and costs nearly \$500 more than ProShare.

LiveLAN's collaboration software, LiveShare Plus, looks nothing like NetMeeting but is compatible with it. And its user interface offers a better compromise between power and simplicity than CU-SeeMe or ProShare, which leaves too many questions unanswered. ■

Essex is a reviewer in Antrim, N.H.

MOREONLINE

For tips on buying videoconferencing systems, see our Web site.
www.computerworld.com/more

Desktop Videoconferencing

BY BARB COLE-GOMOLSKI

Desktop videoconferencing systems can be an alternative to in-person meetings. Rather than fly people in for a powwow at corporate headquarters, a quarterly sales meeting could be held via a desktop videoconference.

That could mean a savings in the cost and inconvenience of travel and a higher quality of communication.

This includes the ability of participants to access and share information that's stored on their PC during the videoconference.

With PC-based videoconferencing, you call colleagues right from your PC, and they see your documents as you see them, along with your image and voice.

Software tools let you highlight and edit the information as you discuss it.

During the past few years, the cost of desktop videoconferencing kits has plummeted from about \$5,000 per user to about \$1,000 per user.

Because of improvements in software and hardware, the quality also has greatly improved.

Most desktop videoconferencing systems run on existing PC hardware. "For the most part, these products will run

on 486s and don't require lots of memory or hard-disk space," says Andrew Davis, principal at Wainhouse Consulting Group in Brookline, Mass.

An Exception

One exception is Intel Corp.'s ProShare Video System 500. That product requires a Pentium II processor running at 233 MHz, Davis says.

As for network requirements, most desktop videoconferencing today will run over a typical corporate network such as an IP network or a corporate WAN — a long-distance network that connects corporate headquarters to far-flung offices via dial-up

DEFINITION

Desktop videoconferencing is a PC-based application for exchanging audio and video data over a network. During a videoconference, you hear the voice of the person with whom you are conferencing and see his image in a window on your PC. To add this technology to a PC, you need a kit that includes a camera that is installed on top of a PC, speakers, a microphone and software to compress the audio and video files.

connections or dedicated lines.

Previously, desktop videoconferencing required Integrated Services Digital Network — a high-speed standard that allows access to voice and data services over a public network — which many companies lack at the desktop level.

But Christine Perey, president of Perey Consulting in Placerville, Calif., cautions that if companies want to roll out hundreds of those systems, they're going to eat up a lot of bandwidth.

For that reason, many companies favor the more easily managed room-based videoconferencing systems, accord-

ing to industry analysts.

There are other issues surrounding desktop videoconferencing, according to Sujata Ramnarayan, an analyst at Dataquest in San Jose, Calif. "The products are still evolving and are not that easy to use," Ramnarayan says.

There also are questions about the payback for investing \$1,000 per desktop to watch video, but that may change as the prices of these systems continue to fall, she adds. ▀

MOREONLINE

For links to desktop videoconferencing articles, books, vendors and other resources, see our Web site, www.computerworld.com/more

Looking Good

Here are some tips for making a good visual impression while participating in a videoconference:

■ Close-up shots are best. You should be framed in the center of the picture, and eye contact is essential.

■ Consider your lighting. The lack of good lighting will result in a poor, washed-out picture.

■ Choose your background carefully. A neutral color in an uncluttered background works best.

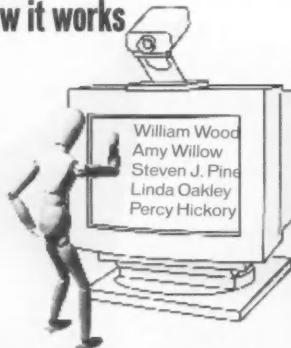
■ Get close to the microphone. You don't just want to be seen, you want to be heard, too.

■ Watch what you wear. When it comes to wardrobe, avoid blues, reds, blacks and whites. Warm, matte colors work best on camera.

■ Keep jewelry to a minimum. Dangling earrings, shiny necklaces and reflective watches cause lighting problems for the camera.

SOURCE: ZIELINSKI PRODUCTIONS INC., HUNTINGTON BEACH, CALIF.

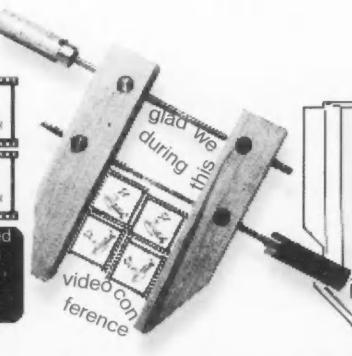
How it works



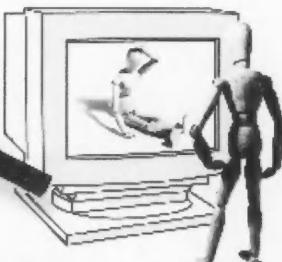
1 A user selects the name of the person he wishes to call in an on-screen directory or database, or enters the number of the person he wants to see into the desktop videoconferencing application.



2 A camera and microphone attached to the user's PC captures his image and voice.



3 The user's system compresses the video and audio and puts them in a format that can be sent over a network.



4 The video and audio are decompressed to produce images on the recipient's screen and sound through his speakers.

JOHN DAXTER/ALME DESIGN

TECHNOLOGY

NETWORKING SKILLS

Master of All Trades

Networking gurus find cross-industry opportunities By Fawn Fitter

NETWORKING SKILLS of all sorts — TCP/IP, LAN, WAN and so forth — are in demand in many industries across the country. Even in fields that are growing slowly, if at all, information technology departments are keeping their networking groups fully staffed and fending off the advances of headhunters eager to lure employees away. For IT professionals, that means opportunity, especially if you have a few years' experience. Here's a look at the job market as seen through the eyes of players in four major industries.

EDUCATION

The University of Virginia at Charlottesville may be more wired than the average campus, with an Ethernet port at every telephone and a large and complex set of networks linking 500 buildings spread out over 1,000 acres. But it's still a good example of the opportunities available to networking professionals in higher education, says Mark J. Smith, manager of the network systems group at the university.

The group, which is responsible for Internet access, E-mail, news and router infrastructure, requires networking professionals to have at least three years' experience. Salaries for those professionals range from \$40,000 to \$70,000.

Right now, Smith needs someone experienced in PC client networking, writing installers for commercial software packages and evaluating hardware and software. In general, he looks for candidates with experience in C++, Perl and the Solaris operating system. And though Smith hasn't needed people who can do detailed Web programming, "almost everyone in the group has been called upon to throw something up on a Web page," he says. Also, he adds, "communication skills are becoming as important as technical skills."

Turnover in Smith's group is low. Some people who have left his group to work in private industry have returned a few years later, something he says is "a tribute to how interesting the work we do here is."

FINANCIAL SERVICES

Boston-based Fidelity Investments is looking for people who want to use technology to solve business problems. "We aren't the research-and-development shop — you have to have an interest in the business, not just the technology," says Paul H. Lesser, director of staffing for technology.

Right now, Fidelity needs networking professionals with a Unix or Windows NT background who can work efficiently in a high-volume atmosphere. Hot

skills in demand are Simple Mail Transfer Protocol and TCP/IP, although LAN and WAN are also in some demand, Lesser says.

Fidelity recruits aggressively and constantly, bringing in entry-level talent from colleges and trade schools as well as hiring more experienced professionals. Because 25% of the company's employees work in IT, there's also plenty of opportunity to move around internally. "If you have the skill set, you'll

have multiple offers, so we have to convince you that we're the right place for you to join," Lesser says. "For people with this skill set, we're always looking for the right type of talent."

HEALTH CARE

The health care industry is full of growing organizations. Many are committed to leading-edge systems and urgently in need of the same skills demanded by more visible fields, says Judy Klickstein, deputy CIO at Boston-based Partners Healthcare System, an organization of physician groups, home health care organizations and leading hospitals in Massachusetts.

"While salaries aren't top-dollar, they are competitive, [and] working in health care lets you deal with large organizations and complex issues in a 'do-gooder' environment," Klickstein says. "Mission-critical clinical systems have to be able to operate at fault-tolerant levels, which can be a real professional challenge."

At Partners, networking is split into two groups. Network engineering takes care of the WAN, the TCP/IP from a Cisco router and a legacy Token Ring system. The back-office group handles NT and some legacy NetWare systems. Of the two, the back-office group has more openings — it's trying to standardize its 25,000 to 30,000 clients on NT, with Exchange as the backbone.

Partners has a particular need for people with strong NT experience, database administration in Oracle and Sequel servers, and WAN engineers facile in IP. The company also is ramping up in PeopleSoft. How hot is the market? "If you could put the name of our technical recruiter in this article, you'd make me very happy," Klickstein says.

UTILITIES

Consolidation and deregulation have slowed job growth in the utilities industry, where facilities tend to have well-developed networks already. But though there's not much room for expansion, companies are constantly trying to keep up with predominant market practices to make themselves more attractive to potential merger partners, says George Weston, general manager of IT at Cincinnati-based Cinergy Corp.

Cinergy, which provides gas and electricity to parts of Indiana, Ohio and Kentucky, uses TCP/IP for its primary network and is starting to look for employees with NT networking and intranet experience. Meanwhile, a legacy SNA network and Novell are being phased out. ▀

Industrial Demands

Expected hiring demand for networking skills in 1999

| INDUSTRY | IBM APPC | IPX | SNA | TCP/IP | WAN |
|---------------------------|----------|-----|-----|--------|-----|
| Business services, IT | 17 | 33 | 33 | 83 | 17 |
| Business services, non-IT | 14 | 36 | 7 | 68 | 11 |
| Media | 10 | 20 | 10 | 90 | 20 |
| Education | 2 | 33 | 7 | 83 | 7 |
| Financial services | 16 | 42 | 37 | 76 | 13 |
| Government | 5 | 29 | 24 | 81 | 10 |
| Health care | 3 | 40 | 30 | 83 | 10 |
| Utilities | 13 | 38 | 50 | 63 | 13 |
| Transportation | 17 | 50 | 17 | 75 | 0 |
| Telecommunications | 0 | 14 | 14 | 57 | 14 |
| Retail | 16 | 21 | 21 | 69 | 0 |
| Insurance | 19 | 25 | 50 | 63 | 6 |
| Hospitality | 0 | 33 | 33 | 67 | 33 |

SOURCE: COMPUTERWORLD'S 1998 ANNUAL SKILLS SURVEY OF 494 IT HIRING MANAGERS

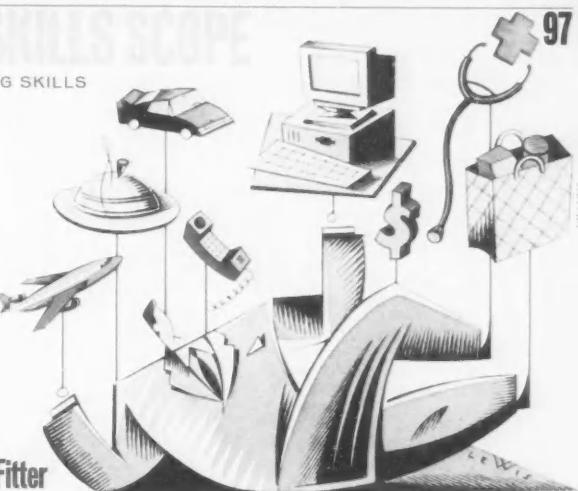
Market Demands



Percentage of managers hiring these networking pros

| LAN manager (permanent staff) | P | M | WN | WS | EN | ES | MA | SA | NE |
|-------------------------------|----|----|----|----|----|----|----|----|----|
| Network administrator/analyst | 40 | 12 | 23 | 17 | 52 | 28 | 32 | 33 | 47 |
| Total | 5 | 4 | 9 | 4 | 15 | 12 | 16 | 22 | 24 |

SOURCE: COMPUTERWORLD'S NOVEMBER 1998 HIRING FORECAST SURVEY



Fitter is a freelance writer in Brighton, Mass.

IT CAREERS

COMPUTERWORLD January 11, 1999

Senior Quality Assurance Engineer Evaluate and tests new or modified software programs and software development environment. Program function according to user requirements. Ensure interaction of open-system/client server environments and distributed management systems on Unix. Write and revise test procedures for program design and product evaluation. Create & oversee the implementation of automated test tools. Develop integration and regression test plans scripts and job streams for testing proposed products. Responsible for the creation of test cases and the modification to existing code used on both open and mainframe systems; lead troubleshooting efforts and direct product developers. Salary \$60,000/yr. 40 hours/wk.

REQUIREMENTS: Bachelor's degree in Computer Information Systems or the US equivalent in training and experience. Minimum of 5 years experience, minimum of a reliable credentials evaluator plus 2 years experience in job offered or 3 years experience as a Technical Computer Support Analyst for the Texas Workforce Commission, Austin, Texas or send resume to the Texas Workforce Commission, 1117 Trinity, Room 4247, Austin, TX 78701. J.O # TX 061581. Ad placed by An Equal Opportunity Employer.

Systems Analyst

Systems Analyst to write detailed descriptions of user needs, program functions and designs. Modify computer programs, direct and coordinate work of others to develop, test, install and maintain computer systems to analyze user requirements, procedures and problems to automate processing or to improve existing computer systems using experience Visual Basic 4.0, MS SQL Server, C++, OLE, and ODBC. Requirements: Master's Degree in Computer Science or related field and 2 years experience as a Systems Analyst knowledge of Visual Basic 4.0, MS SQL Server, C++, OLE, and ODBC. Minimum of 2 years working conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Terri Kinney, Armstrong County Job Center, 1270 N. Water Street, PO Box 759, Kittanning, PA 16201. Job No. 102245.

DATABASE ADMINISTRATOR Database Administrator to do logical and physical design of Oracle databases. Implement Oracle scripts applying knowledge of Database Management Systems; Calculate optimum values for Oracle database parameters; perform reports interfaces to External Vendors using SQR, Crystal Reports, PSQuery, and Unix Shells. Perform data conversion procedures. Help users with functional aspect of various modules like HR, Benefits, Payroll, AP, GL, AR and other HRMS and Financial Modules. Train and advise clients on application customization and use. Also responsible for Data warehousing and data migrations between various databases. Req. Master's in Computer Science/engineering or mathematics, plus 2 years experience with a minimum of one year exp. in job offered. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Terri Kinney, Armstrong County Job Center, 1270 N. Water Street, PO Box 759, Kittanning, PA 16201. Job No. 8045030

N.E. Ohio specialty chemical co. seeks an INFORMATION TECHNOLOGIST to develop & manage internal software applications globally over the internet/intranet, guide management on Information Technologies & initiatives, and communicate the use of Information Technologies for supporting business strategies. Candidate must have: B.S. degree in Information Technology, Computer Science or a related field and 3 to 5 yrs related exp including training others in project management, interviewing and managing large-scale global information systems. Please send resume to: Computerworld, CW-9302, 500 Old Colony Park, Framingham, MA 01701.

Software Engineer (5 openings): Design, develop and implement software applications to determine feasibility of design and directs software testing procedures, programming and documentation. Work involves extensive travel and frequent relocation. Must have at least 3 years of experience using 1 of Group A and 1 of Group B and 1 of Group C. OR 2 of Group A and 1 of Group B and 1 of Group C. OR 1 of Group A - DB2, IBM3090, IBM ES9000, Sun Solaris, Sun Solaris Group B - A5/400, RPG400, CL400, CICS, TSO/VSAM, IMS, COBOL, C, Turbo COBOL, JCL. Master's degree in one of several limited fields: Computer Sci/Apps, Eng., Chem, Math or Physics. Will accept a B.S. deg. with five years experience as a computer professional. Salary is \$70,000 per/yr. 40 hrs/wk. 9:00-5:00 p.m. Please submit resume to: Mr. James Clarke Woods, Acting Manager, Pittsburgh East Job Center, 32 lowe Street, Uniontown, FL 32252.

Software engineer with 5 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering, and mathematical analysis with 5 years experience using Oracle, SQL, PL/SQL, Unix, and windows. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications or physics. \$68,000/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resumes, listing job order number 5022379, to Mr. James Clarke Woods, Acting Manager, Pittsburgh East Job Center, 32 lowe Street, Uniontown, PA 15401.

Systems Engineers (two openings) - Design, analyze, develop, customize, implement and upgrade PeopleSoft HRMS and Financial Modules, PeopleTools, PeopleCode, SQR, Unix, Windows NT, Oracle, and Batch Processing Applications. Design and develop reports interfaces to External Vendors using SQR, Crystal Reports, PSQuery, and Unix Shells. Perform data conversion procedures. Help users with functional aspect of various modules like HR, Benefits, Payroll, AP, GL, AR and other HRMS and Financial Modules. Train and advise clients on application customization and use. Also responsible for Data warehousing and data migrations between various databases. Req. Master's in Computer Science/engineering or mathematics, plus 2 years experience with a minimum of one year exp. in job offered. Working Conditions: 8:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Terri Kinney, Armstrong County Job Center, 1270 N. Water Street, PO Box 759, Kittanning, PA 16201. Job No. 8045030

Software engineer, who will develop software systems, applying computer science, engineering, and mathematical analysis, with 4 years of experience using Oracle. Designer 2000, Oracle 8i, Oracle 8i, Windows NT, Digital UNIX, ARCSINFO, ESRI and Oracle Enterprise Manager. Analyzes software requirements and performs testing and user training after development. Extensive travel and frequent relocation. Requires Master's degree, but will accept Bachelor's degree plus all of 5 years experience as a computer professional in lieu of the Master's degree. Must have a bachelor's degree in one of several limited fields: engineering, mathematics, computer applications or physics. \$88,000/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resumes, listing job order number 8044908, to Ms. Charlene Cogley, Manager, Beaver Falls Job Center, 2103 Ninth Avenue, Beaver Falls, PA 15010.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications; analyze software requirements and performs testing and user training after development. Unix, Windows NT, Oracle, and Batch Processing Applications Design and develop Complex reports, interfaces to External Vendors using SQR, Crystal Reports, PSQuery, and Unix Shells. Perform data conversion procedures. Help users with functional, performance, and upgrade requirements. Req. Bachelor's Degree, Payroll, AP, GL, AR and other HRMS and Financial Modules. Train and advise clients on application customization and use. Also responsible for Data warehousing, maintenance, and data migrations between various databases. Req. Master's in Computer Science/engineering or other appropriate field, plus 3 years experience in one of several limited fields: Computer Sci/Apps, Eng., Chem, Math or Physics. Will accept a B.S. deg. with five years experience as a computer professional. Salary is \$70,000 per/yr. 40 hrs/wk. 9:00-5:00 p.m. Please submit resume to: Mr. James Clarke Woods, Acting Manager, Pittsburgh East Job Center, 32 lowe Street, Uniontown, FL 32252.

Software engineer with 3 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, with 3 years experience using Oracle, PL/SQL, Unix, and windows. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Terri Kinney, Armstrong County Job Center, 1270 N. Water Street, Uniontown, PA 16201.

Software Engineer (multiple openings) - Design, develop, implement, test, install and maintain Client/Server based applications using data model, object-oriented and structured methodologies. Visual Basic, VBA, C, RDO, windows API's, Crystal Reports & ODBC under Windows/UNIX based Systems. Database implementation in SQL Server/Oracle. Requirements include a Masters degree in Computer Science/Engineering or related discipline plus 2 years experience in one of several limited fields: engineering, mathematics, computer applications or physics. \$62,000/yr. Resume to: Branch Manager, Systemware Professional Services, Inc., 630 One Premier Plaza, 5605 Glenridge Dr., Atlanta, GA 33256.

Programmer Analyst Plan, develop, and test computer programs to evaluate user requests for new or modified programs, and use Cobol II, IMS/DB/DC, and Telcon. Req. Bachelor's degree (or equiv in its area of study) and 2 years experience in one of several limited fields: engineering, mathematics, computer applications or physics. \$62,000/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resume along with Social Security Number to: Indiana Department of Workforce Development, 10 N. Senate Ave., Indianapolis, IN 46202. Attention: Gary R. Replogle. Include ID # 8034682

Acclaim Systems is looking for Programmer Analysts with BS and 2-3 years experience in any of the following skills: PeopleSoft, Web Based C++, Remotely COBOL, Oracle (Developers), COBOL, Oracle (Analysts) and 1-3 years experience in project management, database administration, computer configuration and requirement analysis. Acclaim Systems offers all its employees competitive compensation packages. If you are interested in this position, please send your resume to: Acclaim Systems Inc., PO Box 90, Fox River Grove, IL 60021.

SOFTWARE ENGINEER Software engineer to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in Visual Basic 5.0, PowerBuilder, C and MS SQL SERVER. Requirements: Master's Degree in Computer Science or related field and 3 to 5 years experience as a software engineer. Knowledge of Visual Basic 5.0, PowerBuilder, C and MS SQL SERVER. Salary: \$55,000/yr. 40 hours/wk. 9:00 A.M. to 5:00 P.M., 40 hours/week, involves extensive travel and frequent relocation. Apply: Ms. Charlene Cogley, Beaver Falls Job Center, 2103 Ninth Avenue, Beaver Falls, PA 15010. Job No. 5022444

SOFTWARE ENGINEER Software engineer to design, develop, test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in CGI, Java, JavaScript and Oracle. Requirements: Bachelor's Degree or equivalent in Computer Science or related field and 2 years experience as a software engineer, knowledge of CGI, Java, Java Script and Oracle. Salary: \$57,000/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resume, listing job order number 5022442, to: Mr. Ron Mars, Manager, Alle-Kiski Job Center, 3 Kensington Square, New Kensington, PA 15068.

SOFTWARE ENGINEER Multiple openings for software engineer's to design, develop and test computer programs for business applications; analyze software requirements to determine feasibility of design; direct software system testing procedures using expertise in DB2 CICS, COBOL II, Remotely COBOL, Oracle (Developers), COBOL, Oracle (Analysts) and 1-3 years experience in project management, database administration, computer configuration and requirement analysis. Acclaim Systems offers all its employees competitive compensation packages. If you are interested in this position, please send your resume to: Acclaim Systems Inc., PO Box 90, Fox River Grove, IL 60021.

Software engineer with 3 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 5 years of experience using Oracle, with some experience using PowerBuilder. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications, business, or commerce. \$72,000/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resumes, listing job order number 8044631, to Mr. James Woods, Acting Manager, Pittsburgh East Job Center, 626 Broad Street, Pittsburgh, PA 15206.

Software engineer with 5 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 5 years of experience using Oracle, with some experience using PowerBuilder. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications or physics. \$68,500/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resume, listing job order number 5022379, to Washington Job Center Manager, Milcraf Center, Suite 150, 90 West Chestnut Street, Washington, PA 15301. Job No. 5091231.

Software engineer with 5 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 5 years of experience using Oracle, RDBMS, Oracle Forms, Oracle Reports and PL/SQL. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications or physics. \$65,000/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resume, listing job order number 7044492, to Mr. James Mackie, Actg Manager, Pittsbridge North Job Center, 1122 Westmore Avenue, Pittsburgh, PA 15233.

Software engineer with 2 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 5 years of experience using Oracle, PL/SQL, SQL Forms, and Pro/C. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications or physics. \$78,000/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resume, listing job order number 5022442, to: Mr. Ron Mars, Manager, Alle-Kiski Job Center, 3 Kensington Square, New Kensington, PA 15068.

Software engineer with 5 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 5 years of experience using Oracle, PL/SQL, SQL Forms, and Pro/C. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications or physics. \$78,000/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resume, listing job order number 5022442, to: Mr. Ron Mars, Manager, Alle-Kiski Job Center, 3 Kensington Square, New Kensington, PA 15068.

Software engineer with 5 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring supervision of other computer professionals, with 5 years of experience using Oracle, PL/SQL, SQL Forms, and Pro/C. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications or physics. \$78,000/yr. 40 hours/wk. 9:00 am - 5:00 pm. Send resume, listing job order number 5022442, to: Mr. Ron Mars, Manager, Alle-Kiski Job Center, 3 Kensington Square, New Kensington, PA 15068.

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Manager of Computer Operations or Computer Professional with 5 years of experience, who will be responsible for managing and directing work performed in computer operations applying engineering, computer science and mathematical analysis, with 3 years of management experience and 3 years of work experience using Windows, UNIX, Accell, Powerbuilder and RDBMS. Duties: Develops and implements policies and procedures for carrying out computer operations. Extensive travel and frequent relocation. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications or statistics. \$125,000/yr. 40 hrs/wk. 9:00 am - 5:00 pm. Send resume, listing job order number 5022379, to: Mr. Stan Majesky, Manager, Green County Job Center, 653 East High Street, Waynesburg, PA 15370.

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IBM Mainframe: COBOL, DB2,
CICS, IMS, MVS, ZEKE/
CTRLM, CASE Tools (IEF/
ADW/Composer)

DBs: Oracle, Sybase

All positions require a significant degree of travel as well as a Bachelor's degree in a related field. Some positions require a Master's degree and/or significant experience in systems integration in the Public Sector Industry. Please fax resumes to 1-888-277-5599. Please indicate job code WLMCW011199, and for optimum results, use non-italic font, minimal graphics, bolding and underlining.

We have positions available in Chicago, IL; Cincinnati, OH; Dallas and Houston, TX; Boston, MA; Hartford, CT; Newark and Jersey City, NJ; New York, NY; Philadelphia and Pittsburgh, PA; throughout CA; Detroit and Ann Arbor, MI; Kansas City, KS and MO; and Seattle, WA.

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**THEM:
Everything
is black
or white.**

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ICS

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For more than 25 years, CPL WorldGroup has supported customers across the U.S. with top talent. Are you ready to join us? We need contractors! Programmers/Analysts to Systems Analysts! with the following skills:

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Programmer Analyst - PC Networking/Sys. Admin. & Appl. Integration: Utilizing knowledge of networking topologies, TCP/IP, LAN/WAN technologies & PC architecture install, configure & manage physically distributed computer networks & network operating systems. Provides user support, network troubleshooting, network expansion, printer services & back-up mgmt. Coordinates local & remote hardware & software configuration, implements & executes the operators procedures & monitor system resource utilization; perform capacity planning. Interface, main application, network, underlying, and working, software. Carry out performance tuning of network for user applications. Req. comp. sci./math/engr/gscl/business-commerce or equivalent, or exp. in one or more as a programmer/analyst/systems analyst. Must have appropriate combination of skills as follows: 2 of A & B or B & C or D; or 2 of A & A/B & C or 1 of A, B, C, D. Includes: Operating Systems: Novell NetWare, Windows NT, OS/2, Windows 95, LAN Server, Banyan Vines, LANmanager, LANTastic, B included; network protocols: TCP/IP, FTP, Windows for Workgroups, NetBIOS, X.25; C includes: network mgmt.; SNMP, LANalyzer, NetView, Network manager, RMON, network management, Ethernet, Token Ring, FDDI. High mobility preferred. (Multiple positions) #0 hrs/wk: \$55,300 - \$65,000/yr. Report/submit resume to: James Clark, Manager, Mgr., Pittsburgh North Job Center, 1122 Western Avenue, Pittsburgh, PA 15233, JO #044923.

Software engineer with 1 year of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering and mathematical analysis. 1 year of experience with using C++, Visual C++, Sybase and Powerbuilder. Analyses s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Master's degree in one of several limited fields: engineering, mathematics, computer applications, physics, etc. #0 hrs/wk: \$40,000 - \$50,000/yr. Send resumes, listing job order number 704881, to: Mr. Richard Introcaso, Actg. Mgr., Beaver County Community Merchant Street, Uniontown, PA 15003.

Software engineer with 2 years of experience as a s/w engineer or computer professional, who will develop s/w systems, applying computer science, engineering and mathematical analysis. 2 years of experience using Oracle RDBMS, PL/SQL. Analyses s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocation. Master's degree in one of several limited fields: engineering, economics, business, business administration, commerce, mathematics, computer applications, physics, etc. #0 hrs/wk: \$72,000/yr. Send resumes, listing job order number 709110, to: Ms. Janice Clark, Manager, Merchant Street, Uniontown, PA 15401.

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Using TSO, MVS, CICS, COBOL, DB2, Related Tools

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Client/Server Systems Integrator

LAN/WAN Management/Administration

NT Systems Administration

Experienced I/T Managers

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Systems/Analyst wanted by Computer Services Co. in Levittown, PA. Must have 1 yr experience doing systems analysis & design for client/server distributed system using ERWin, wPowerBuilder for front end dvlpmnt in a UNIX envrnmnt wORACLE dbase & internet/intranet dvlpmnt using PL/SQL. Bachelors in Bus. Admin, MIS or Comp Sci reqd. Tel: 2100 Parklane Drive, NE, Suite F, Atlanta, GA 30345-2167.

SOFTWARE ENGINEER to design, develop, implement, test, maintain and support application software and GUI modules for telecommunication industry clients using object-oriented methodologies. Previous experience with Microsoft Visual Basic, Rational Rose, and SUN Workshop on Sun Solaris platforms. Requires M.S. degree in Computer Science or an Engineering discipline, with two years of experience in the job offered. Extensive travel on assignment to various client sites within the U.S. is required. Salary: \$75,000 per year, 8 am to 4:30 pm, M-F. Mail resume to: Personnel Dept., Roshitech, Inc., 2100 Parklane Drive, NE, Atlanta, GA 30345-2167.

Software Engineer wanted by Software Dynamics & Consulting Co. in Nashua, NH. Must have 2 yrs exp analyzing, dsgnng & dvlpmg s/w sys using CGI scripts, HTML, Unix, Oracle & Java. Masters in Comp Sci, Eng or Math reqd. Respond to: HR dept, Roshitech, Inc., 20 Spindletop Dr., Nashua, NH 03062.

Software Manager, Charlotte, NC. Analyze, design and develop medical integration system using C, Visual Basic, C++, Sybase and Oracle. Req'd: 5 yrs exp in design, development and maintenance of custom programs/queries in Visual C++ for GUI development and database Access. Req'd: Bachelors in Computer Science or related discipline, 40 hrs per week, 9am-5pm, \$32,000/yr. All resumes must include the applicant's Social Security number, and the Job Order Number NC 261333 and DOT code 030 162-014. Applications are to be sent to the Service office or to submit a resume to: Job Service, 500 W. Trade Street, Charlotte, NC 28202.

Programmer-Analyst, Atlanta. Develop, support, test, maintain and enhance business applications software utilizing RPG/IV, ILE, SQL/400, DB2/400, CL, AS/400, BS, computer science, bus. admin. or related discipline. \$74,500/yr. Positions: (3) Send resume to: B. Hoeve, Secon Group, Inc., 725 Way Rd., Roswell, Georgia 30076.

Software ENGINEER wanted by Computer Services Co. in Edison, NJ. Must have 1 yrs experience in requirement studies, business mapping, gap analysis, gap resolutions, dvlpmnt, testing & customization of comp s/w using ORACLE FINANCIAL, ORACLE DEVELOPER 2000 and DESIGNER 2000 in a UNIX envrnmnt. Masters in Bus. Admin. or Computer science reqd. Respond by resume to: HR Dept, Horizon Computers, Inc., 5 Lincoln Hwy, Edison, NJ 08820.

At CP&L, we design, develop, test and maintain complex computer systems and applications. Our clients include Fortune 500 companies. CP&L offers a competitive salary and benefits package. Please send resume to: ITSD Recruiter, FAX: 970-546-2426 or E-Mail: IT.recruiter@cplic.com. No phone calls, please. We are an Equal Opportunity/Affirmative Action Employer.

Programmer-Analyst(3). At CP&L, we design, develop, test and maintain complex computer systems and applications. Our clients include Fortune 500 companies. CP&L offers a competitive salary and benefits package. Please send resume to: ITSD Recruiter, FAX: 970-546-2426 or E-Mail: IT.recruiter@cplic.com. No phone calls, please. We are an Equal Opportunity/Affirmative Action Employer.

IT CAREERS MIDWEST

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Mfg Software Engineer: Requires M.S. in Ind Eng or Eng Mgt with 4 yrs exp in FDA validation and LIMS (Laboratory Inventory Mgmt. Systems), MES (Mfg Execution Systems) and ERP (Enterprise Resource Planning) implementation. 60% travel required. Will develop, implement, and support MES, ERP and LIMS applications for our multiple plants. Salary \$61,700-\$63K DOE. Qualified applicants send resumes to: Mallinckrodt, Inc., K. McCloskey, Job No. 527, PO Box 5840, St. Louis, Missouri, 63134. Equal Opportunity M/F/D.

SENIOR CONSULTANT: Rosemont, IL Analyze user requirements, design, develop and customize Oracle manufacturing/financial applications, relational database management systems. Implement Oracle applications/systems in Windows NT and UNIX environments. Design, Develop Oracle applications using SQL, PL/SQL, C, Oracle tools and UNIX. Administer Oracle databases, including installation, patching, tuning, user support and systems administration. M.S. in Computer Science or Computer Science and Systems. 2 years of experience in the job offered. Yearly salary: \$70,000. Apply and send two (2) copies of resume/letters to Job Order # 99-039, P.O. Box 989, Concord, NH 03302-0989.

Software Engineer: Rosemont, IL Analyze user requirements, design, develop and customize Oracle manufacturing/financial applications/systems in Windows NT and UNIX environments. Design, Develop Oracle applications using SQL, PL/SQL, C, Oracle tools and UNIX. Administer Oracle databases, including installation, patching, tuning, user support and systems administration. M.S. in Computer Science or Computer Science and Systems. 2 years of experience in the job offered. Yearly salary: \$70,000. Apply and send two (2) copies of resume/letters to Job Order # 99-039, P.O. Box 989, Concord, NH 03302-0989.

SYSTEMS ANALYST - Peoria, IL Analyze, design, develop, program, test and implement database management systems. Develop and project management tools. Create and maintain front end, MS Access as the database, Crystal Reports as the reports writer and Powerpoint's Slides etc. etc. as the CA tool. Develop query based project monitoring tools using Visual Basic front end tool and AS400 as the database. Analyze user requirements, design, develop and problems to automate processing and improve existing computer system. Identify and learn specific input/output requirements, data formats, file formats and reports format 8 a.m. to 5 p.m. 40 hours/week. Salary \$55,000 per year. Require at least a Bachelor of Science Degree in Computer Science or equivalent 3 yrs. work experience in the job offered or 5 years' work experience in the related occupation of a Systems Analyst. The work experience must include combined experience in the following computer skills: essential to job duties: Visual Basic, MS Access, Crystal Reports. Must have proof of legal authority to work permanently in the U.S. No calls - Send 2 copies of both resume & cover letter to: Illinois Department of Employment Security, 401 South State Street -7 North, Chicago, IL 60605. Attn: Arlene Thrower, Ref # V-IL 19370-T. An EMPLOYER PAID AD. NO CALLS-SEND 2 COPIES OF BOTH RESUME & COVER LETTER.

SYSTEMS ANALYST (Oakbrook, IL) Design & devel. data processing & info manag. systems, Oracle, C, C++, Unix, SQL. Maintain client/server envir. & relational database. Determine system specifications. Analyze system specifications for completeness & conformance to standards. Design program logic to meet specifications & to add value to present system. Using Oracle, C, C++, SQL. Unix. Code program instruct using SQL & Unix. Prepare test data & test coded programs. Test programs. Ensure all procedures used throughout system. Master's in Bus Admin or Info Syst. or Comp Sci. or Eng. 4 yrs exp. in Exp. in Oracle, C, C++, Unix, SQL. 40 hrs/wk. 9a-5p. \$60.00/84/hr. Must have proof of legal authority to work permanently in the U.S. No calls - Send 2 copies of both resume & cover letter to: Illinois Department of Employment Security, 401 South State Street -7 North, Chicago, IL 60605. Attn: Sheila Lindsey, Ref # V-IL 19318-T. An employer paid ad. NO CALLS-send 2 copies of both resume & cover letter.

Principal Software Engineer Workstation integration including analysis of various network system modifications required to support the needs of the project. Directs the related object-oriented methodology, module implementation to insure quality, reliability and consistency of performance on various platforms. Requires Masters degree in Computer Science or Software Engineering. Minimum 3 years experience in the job to be performed. Hours: 9:00 a.m. - 5:00 p.m. 40 - 40 hours per week at \$30.00 per hour. Must have proof of legal authority to work permanently in the U.S. No calls - Send 2 copies of both resume & cover letter to: Illinois Department of Employment Security, 401 South State Street -7 North, Chicago, IL 60605. Attention: John Sykes, Reference #V-IL 1993-S. AN EMPLOYER PAID AD. NO CALLS.

B.S. in Applied Mathematics or Computer Science required. One year experience in the paralegal or one year as a Software Developer required. Experience in related position must include the design and development of software using NEXTSTEP and Sybase.

40 hrs/wk. 9:00 a.m. - 5:00 p.m.; \$64,500/year. Must have proof of legal authority to work permanently in the U.S.

Send 2 copies of both resume and cover letter to: Illinois Department of Employment Security, 401 South State Street -7 North, Chicago, IL 60605. Attention: Barbara Kelly, Ref #V-IL 20223-K. An EMPLOYER PAID AD. NO CALLS-SEND 2 COPIES OF RESUME & COVER LETTER

Software Engineer: 40hrs/wk. 9am-5pm; sal-\$64,000+/yr.; reqs: M.S. in Computer Science & 2 yrs. exp. in PC operations, C, C++, Unix, SQL, 40 hrs/wk. 9a-5p. \$60.00/84/hr. Must have proof of legal authority to work permanently in the U.S. No calls - Send your resume to: The Iowa Workforce Center, 214 Keeler, West Moines, Iowa 50309-1727. Please refer to Job Order IA100805. Employer paid advertisement.

Information Technology Specialist/Database Administrator - Create, maintain, update and analyze information systems. Install OS and application software, and maintain, upgrade, test and configure PCs; and provide technical support, consultative services, and troubleshoot software, databases and network maintenance. B.S. in Comp Sci. or CIS plus 2 yrs. exp. in job offered or as a database administrator. 2 yrs. exp. in database design or administration duties under a different job title. Two yrs. exp. in PC operations and maintenance. 1 yr. exp. in Windows OS. 1 yr. exp. in database design and management. 9 college credits in statistics or business administration or equivalent. 40 hrs/wk. 9a-5p. \$30.00/yr. Must have proof of legal authority to work in the United States. Send your resume to: The Iowa Workforce Center, 214 Keeler, West Moines, Iowa 50309-1727. Please refer to Job Order IA100802. Employer paid advertisement.

Software Engineer, Chicago, IL and other client locations. Analyze, design, develop, enhance and maintain software and implement applications in an IBM Mainframe environment using IBM Mainframe management & productivity tools, DB2, CICS, IMS/VSE, COBOL. Req'd Bachelor degree in Comp. Sc. Comp. Engg. or equivalent and 3 yrs of exp. in the job or in Computer Software Development (e.g. Programmer, Programmer Analyst, Systems Analyst, Software Engineer Consultant). 2 years of the experience must be in COBOL, DB2, CICS/VSAM and COBOL. Experience may be concurrent. M-F 8:30 am to 5:30 pm. 40hrs/wk. \$64,084.80/yr. Must have proof of legal authority to work permanently in the U.S. No calls - Send 2 copies of both resume & cover letter.

PowerBuilder Instructor Provide PowerBuilder training to software professionals. Teach intermediate PowerBuilder Classes. Intermediate Developers. B.S. in Computer Science. 2 years of related experience in software development. Experience using PowerBuilder. Must be a Certified PowerBuilder Developer Associate or ability to obtain PowerBuilder certification. Salary: \$70,000. Apply at: The Texas Workforce Commission, 1117 Trinity Room, Austin, Texas 78701. J.O.# TX0016181. Ad Paid by an Equal Opportunity Employer.

Project Leader: Software Engineer Directs, plans and develops an entire software development project from inception (including prototype and beta testing) to completion. Provides the supervision and direction of various Software Engineers (2-5) who will develop and modify applications, including engineering or multimedia systems which are designed to run in client/server environment in OS2, Windows NT and UNIX platforms. Develops and maintains a client/server infrastructure for large scale projects including the establishment of the architecture, design and development of associated systems architecture, class library structure, database servers, database management systems, client workstation integration including analysis of various network system modifications required to support the needs of the project. Directs the related object-oriented methodology, module implementation to insure quality, reliability and consistency of performance on various platforms. Requires Masters degree in Computer Science or Software Engineering. Minimum 3 years experience in the job to be performed. Hours: 9:00 a.m. - 5:00 p.m. 40 - 40 hours per week at \$55,000 per year. Must have proof of legal authority to work permanently in the job offered or 5 years' work experience in the related occupation of a Systems Analyst. The work experience must include combined experience in the following computer skills: essential to job duties: Visual Basic, MS Access, Crystal Reports. Must have proof of legal authority to work permanently in the U.S. No calls - Send 2 copies of both resume & cover letter to: Illinois Department of Employment Security, 401 South State Street -7 North, Chicago, IL 60605. Attn: Joanne Breaux, Reference #V-IL 1993-S. AN EMPLOYER PAID AD. NO CALLS.

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BUSINESS SYSTEMS SPECIALIST

Principal Software Engineer

Perform analysis and design of financial business systems; responsible for all aspects of software development of software infrastructure components that facilitate and support interest rate derivatives systems, using Objective-C, OPENSTEP, and SQL with SYBASE RDBMS.

B.S. in Applied Mathematics or Computer Science required. One year experience in the paralegal or one year as a Software Developer required. Experience in related position must include the design and implementation of software using NEXTSTEP and Sybase.

40 hrs/wk. 9:00 a.m. - 5:00 p.m.; \$64,500/year. Must have proof of legal authority to work permanently in the U.S.

Send 2 copies of both resume and cover letter to: Illinois Department of Employment Security, 401 South State Street -7 North, Chicago, IL 60605. Attention: Barbara Kelly, Ref #V-IL 1994-E. An EMPLOYER PAID AD. NO CALLS-SEND 2 COPIES OF BOTH RESUME & COVER LETTER

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Cereon Genomics' mission is to apply genomics technology to transform agriculture ... making plants harder, naturally disease and pest-resistant, able to grow in some of the most inhospitable conditions. All to improve the quality and quantity of the world's food supply.

In the past few months, we've taken major steps towards achieving that mission by:

- Creating a world class facility
- Implementing a highly advanced sequencing operation
- Acquiring the latest state-of-the-art equipment
- Identifying key projects in genomics, bioinformatics, and robotics
- Bringing together a team of exceptional professionals at all levels

It is with growing excitement that we realize what we have accomplished ... and what is still left to do. That's why we seek more innovators with a focused sense of urgency and a healthy sense of wonder to join us, keep our impressive momentum going, and make the future of genomics technology happen!



SOFTWARE DEVELOPERS

You will be involved in the challenging fields of sequence and genomics analysis. Requires at least 3 years of programming experience and proficiency in two or more of the following: C/C++, Java, SQL (Oracle preferred), PERL, and Web development. Familiarity with biology and genetics preferred.

SOFTWARE DEVELOPERS - LAB AUTOMATION

Apply your development skills and expertise to the areas of bioresearch data management, process control, and robotics systems integration. Must have at least 3 years of programming experience and proficiency in two or more of the following: C/C++, Java, SQL (Oracle preferred), PERL, and Web development. Familiarity with biology and/or bioresearch lab processes preferred.

SYSTEMS ENGINEERS (UNIX)

Openings at Senior and Staff levels to be responsible for one or more of the following in our mission-critical, high-availability Solaris environment: daily systems management, volume management, DNS, email, NFS, backup, and upgrades. Additional responsibilities may include helping ensure optimal performance of database servers, maintaining sequence analysis and developer applications, and maintaining genetic sequence databases. Requires BSCS/EE, plus at least one year of PERL/shell programming. 4+ years of UNIX systems administration experience is essential for Senior position, with 2+ years required for Staff positions. Strong interpersonal skills and ability to work as a team member are necessary.

SENIOR DATABASE ADMINISTRATORS (SYBASE & ORACLE)

Proven leaders to be involved with database creation and maintenance, ensuring optimal performance of database servers, and working with business partner personnel to ensure the smooth integration of proprietary database tools into the Cereon environment. Requires BSCS/EE, plus at least 4 years of Oracle or Sybase database administration experience, preferably in a Solaris environment. Experience with modeling tools (e.g. Erwin, PowerDesigner), middleware connectivity, and PERL/shell programming is essential. Strong interpersonal skills and ability to work as a team member are necessary.

DESKTOP SUPPORT ENGINEERS (PC & MAC)

Support either the total PC desktop (desktops, laptops, lab equipment running Win 95/98/NT) or scientific Mac environment. Specifically, you will install and configure hardware/software, manage upgrades, troubleshoot hardware and software problems, and support standard business software (MS Office, email, Web browser). Mac support also includes supporting scientific applications used by our production sequencing and finishing groups. Requires a BS, plus at least 2 - 3 years of technical support. Experience with UNIX (preferably Solaris) and TCP/IP is essential for Mac support positions. Strong interpersonal skills and ability to work as a team member are necessary.

WEBMASTER

Responsible for oversight and management of the Cereon web site, encompassing business, production, and development sites. Specific tasks include creating web-based user interfaces and content display, plus assisting in the development/deployment of applications that use the web as the user interface. Requires BS, 2 - 3 years of HTML coding, and experience with relational databases. Javascript, PERL, CGI, SQL, and UNIX skills are essential. Good project management and team skills are necessary.

Please send your resume, indicating position of interest, to: Joan Curtice, Cereon Genomics, LLC, 270 Albany Street, Cambridge, MA 02139; Fax: (617) 551-1776. Immigration assistance furnished. Cereon Genomics is an equal opportunity employer, proudly reflecting the natural diversity of the world around us.

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Manager, Technical Publications

We are looking for a highly motivated Manager of Technical Publications. Reporting to the Vice President of Engineering, this person will plan and administer the preparation and release of SKY user manuals, release notes and technical specifications. You will analyze corporate plans, engineering plans and specifications, as well as customer inputs to determine the type and scope of publication required. The successful candidate will interface with Engineering, Customer Service and Marketing to monitor technical documents and establish customer requirements. A B.S. in Electronic Engineering, Computer Science, or a B.S. in Technical Writing is required, together with five or more years of experience in a high technology company.

Senior Software Engineer

Will develop kernel software for state-of-the-art RISC and DSP-based computer architecture. A strong background in ASSEMBLER for pipeline processor architectures and numerical computing methods is essential. The person will be a self-starter, doer and possess a proven track record. A degree in Computer Science, Electrical Engineering or Mathematics, together with five or more years of experience is desired.

Senior Technical Support Specialist

Highly visible position requires broad software and hardware knowledge to include computer architectures, device drivers, communication techniques, application code, UNIX tools, Fortran C/C++ and assembly code. Successful candidate must be a self-starter with solid trouble-shooting and organizational skills. Responsibilities include post installation support for SKY hardware, software and systems, as well as extensive hands-on problem duplication and resolution.

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SOFTWARE ENGINEER to provide on-site consultancy for design, analysis, development, testing and implementation of business and financial applications software on IBM AS/400 and RS/6000, PowerBuilder, Oracle/SQl relational database systems using Sybase/2E, Oracle, CL, ISDB, Query 400 and CM, PDM and DFU. Requirements: M.S./M.B.A. major in Computer Systems and one year's experience in the job offered. 50% travel to client sites within the United States required. Experience must include: Windows development using CASE tool Sybase/2E. Salary: \$65,000 per year, 8:30 a.m. to 5 p.m., 40 hours per week; M-F. Apply with resume to: Todd R. Wolf, Vice President, CompUSA Direct, Inc., 210 Interstate N. Parkway, Suite 700, Atlanta, GA 30339.

SENIOR SOFTWARE ENGINEER to design, develop, implement, test, maintain and support application software for the insurance industry using C, Oracle, PowerBuilder, COBOL and JCL on IBM mainframes operating under MVS/ESA. Perform project management duties to ensure the timely and cost efficient completion of various application development projects. Require: M.S. degree in Computer Science, or a closely related field, with two years of experience in the job offered or as a Software Engineer. Extensive travel on assignments to various company and client sites is required. Salary: \$65,000/yr. M-F, 8:30 a.m. to 5:00 p.m. Send resume to: Elizabeth Haney, Asst. VP, P.M.C. 1 P.M.C. Center (Int'l Ct I-77 & US 21N), Blythewood, SC 29016; Attn: Job KG.

Lock Haven Univ of Penna, a member of the State System of Higher Education, is seeking applications for the following position: Information Resource Manager. Applicants must have a Bachelor's degree in Computer Science, Management Information Systems, or related technical area. Two years of experience with administrative information systems and system management is required. Experience with UNIX administration and relational database management is required. Shell (csh & ksh), Perl, HTML, SQL, and C/C++ programming experience within a client/server environment is highly desirable. Other specialized training in areas of planning, database administration, data security, Web administration and financial accounting will be helpful. Experience with higher education administration is a plus. Please send a resume and three professional references to Mr Gerald Eiseley, Asst. Director of Administrative Computing, Lock Haven University, Lock Haven, PA 17745-2390. Review will begin Jan. 4, 1999 and will continue until the position is filled. LHU is an Equal Opportunity / Affirmative Action Employer, and encourages applications from minorities, women, veterans, and persons with disabilities.

SENIOR SOFTWARE ENGINEER.....

....project lead with two years of industry experience to design, develop and implement software applications using Oracle, Developer 2000, SQL, C++ and Unix. Excellent communications skills required. Master's degree or equivalent required. Fax resume to: Anita (781)932-0895 or email:

asakuru@raymondkarsan.com

Sequel Consulting, Inc. an IT consulting company in S. Plainfield, NJ is looking for individuals to fill the following positions:

i) Project Manager - Must have Bachelor's (any field) & 3 yrs exp in: config, design & devlp comm'l, fin' mgmt applic systems & dsing, writing, implmntg config using:

A) MVS/ESA, TSO/ISPF, IMS DB/DC, DB2/SQL w/CICS, COBOL II & JCL

B) AS/400, COBOL 400, RPG III, CL Progrm, SQL 400, DDS & Synon

C) Oracle 7.31 server envirn (UNIX, DOS, Windows), C++, RDBMS (Oracle or Informix), GUI devlpmnt tools (PowerBuilder or Visual Basic) & TCP/IP

Response to resume to: HR Dept, Sequel Consulting, Inc., 3001 Hadley Rd, #7, S. Plainfield, NJ 07078.

Software engineer with 5 years of experience as a s/w engineer or computer professional who will develop s/w systems, applying computer science, engineering, and mathematical analysis, requiring advanced knowledge of computer professionals with 5 years of experience using Oracle, Oracle Forms and Reports and PL/SQL. Analyzes s/w reqs. and performs testing and user training after development. Extensive travel and frequent relocations. Bachelor's degree in one of several limited fields: engineering, mathematics, computer applications, chemistry or physics. \$60,000/yr. 40 hours/ wk. 9:00 a.m. - 5:00 p.m. Benefits: relocation, living, job order number 8044677, to: Mr. Tom Dembosky, Manager, Indiana Job Center, 350 N. Fourth Street, Indiana, PA 15701.

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Full-time Senior Software Engineer. Responsibilities include utilizing proficiency in C and Shell programming to develop, upgrade and maintain multi-layered software that functions as a fax server and communications tool ("AutoFAX™"), enabling the subscriber to send/receive and file documents via touch-tone telephone. The developer will also write and test the applications layer which provides scheduler, system and database management; responsible for writing UNIX shell scripts and C shell scripts for the AutoFAX™ fax server environment and perform system administration duties for the development system, develop op. test, install and maintain software on a VAX/VMS operating system that transmits messages to single or multiple users by fax machine; must have a Bachelor's Degree in Computer Science or a related field and five (5) years of experience in software engineering. Salary Range: \$62,774.40 to \$85,000 per year. Benefits: 401(k) plan, profit sharing, medical, dental, life, disability, pension, 4 weeks paid vacation, legal authority to work in United States. If interested, submit resume in duplicate to Ms. Robin Bidby, CPT International, 1165 Northshore Parkway Suite 250, Marietta, Georgia 30067.

Programmer Analyst/Systems Analyst

4-6 years experience in an IBM MVS environment, COBOL, and/or Assembler, JCL, and TSO/ISPF is required. DB2, and Clist/Rexx a plus.

Business Analyst

4 years experience in an IBM MVS environment, COBOL, JCL, and TSO/ISPF is required. Knowledge of fulfillment industry as demonstrated by previous experience required.

DB2 DBA (Data Warehouse)

5 years of DB2 application development experience, including thorough knowledge of SQL (DDL, DML, DCL) and the ability to interpret error codes and messages. DB2 DBA experience, including knowledge of DB2 internals, backup and recovery procedures, SQL performance and traces a must.

DASD Sr. Systems Specialist

4 years experience in a large enterprise storage environment supporting DFSMS, TMM, DFSS, and DFHSM. Project management skills, experience with CA-1, and conceptual knowledge of virtual tape a must. SAS experience and exposure to NT and AIX storage management practices preferred.

In addition to an attractive salary, we offer excellent benefits that include an annual performance bonus. For consideration, please send your resume to:

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Dedicate your impressive and interpersonal skills to managing an assigned number of accounts with the goal of generating a quota of overall revenue, gross percent and gross profit dollar monthly. Duties will include receiving telephone orders for products and/or services, and using your skills to increase and cross-sell those orders. **JOB CODE: CW**

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Join our expanding internet team today! In this sales-oriented role, you will field calls from customers, evaluate their needs, and respond to their questions regarding product capability and compatibility. Candidates must be customer oriented with 1-2 years of related sales/telemarketing experience and have the ability to meet quotas. **JOB CODE: CW**

CUSTOMER SATISFACTION REPRESENTATIVES

As an integral member of the Customer Satisfaction Department the enthusiastic candidate we seek will be responsible for providing customers with post-sales product support, responding to customer inquiries, and resolving problems that arise from sales, configuration, billing or delivery. **JOB CODE: CW**

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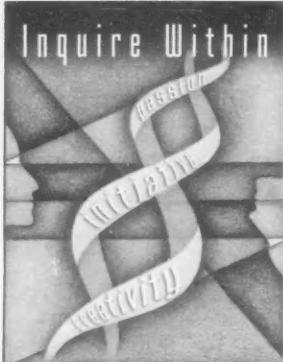


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WEEK IN STOCKS

GAINERS ↑

PERCENT

| | |
|-------------------------|-------------|
| Amazon.Com (H) | 76.8 |
| Lycos Inc. (H) | 71.6 |
| Banyan Systems Inc. (H) | 69.7 |
| Athome Corp. (H) | 61.8 |
| E-Trade Group Inc. (H) | 52.8 |
| The Vantine Corp. | 50.4 |
| Auspex Systems | 49.6 |
| Excite Inc. | 46.1 |

DOLLAR

| | |
|------------------------|---------------|
| Yahoo! Inc. (H) | 103.69 |
| Amazon.Com (H) | 82.23 |
| Athome Corp. (H) | 44.31 |
| Lycos Inc. (H) | 39.00 |
| E-Trade Group Inc. (H) | 25.56 |
| Excite Inc. | 19.88 |
| Intuit (H) | 16.31 |
| Nokia Corp. (H) | 14.38 |

LOSERS ↓

PERCENT

| | |
|----------------------------|--------------|
| Cincinnati Bell Inc. (L) | -47.1 |
| Spyglass Inc. | -19.9 |
| National Instruments Corp. | -11.4 |
| Hmc Software | -9.9 |
| Network Associates | -9.8 |
| IDX Systems | -9.7 |
| The Vantine Corp. | -9.7 |
| Auspex Systems | -9.6 |
| Ciber Inc. | -9.6 |
| Legato Systems Inc. (H) | -9.6 |

DOLLAR

| | |
|----------------------------|---------------|
| Cincinnati Bell Inc. (L) | -17.00 |
| Compuware Corp. (H) | -6.50 |
| Athome Corp. (H) | -6.31 |
| Network Associates | -6.21 |
| Legato Systems Inc. (H) | -6.25 |
| Sprint Corp. | -4.50 |
| Spyglass Inc. | -4.38 |
| IDX Systems | -4.31 |
| National Instruments Corp. | -4.00 |

WARY WORDS FOR NET STARS

Reasons for bullish 'hype' don't justify market values

CONSIDERING the Olympian heights Internet stocks have hit in recent weeks —

Amazon.com Inc. (Nasdaq:AMZN),

Yahoo Inc. (Nasdaq:YHOO) and eBay Inc. (Nasdaq:

INDUSTRY ALMANAC

EBAV), to name a few — many otherwise-cautious investors may be feeling the itch to finally jump on the "dot-com" bandwagon.

Analysts say such an impulse is warranted — the Internet market niche has a potential upside almost without parallel.

But they also warn that buyers should examine each company on an individual basis: An Internet shooting star can fall just as quickly as it rises.

Scott Appleby, an analyst at ABN AMRO Bank NV in New York, describes himself as bullish, adding that Internet stocks "deserve the hype they've been getting." However, he adds that "whether or not they deserve their valuations remains to be seen."

Appleby's caution is apparent in his "hold" rating for Amazon.com, the Seattle-based online bookseller that has tripled its share price in the past two months.

"I don't question the practices of the company, I just think \$135 [per share] is a bit high," Appleby says. Amazon adjusted its stock price for a 3-for-1 stock split last week; the company also announced that its fourth-quarter sales skyrocketed to \$250 million — almost four times its 1997 fourth-quarter sales of \$66 million. But despite stellar holiday sales, Amazon officials said the company will post a quarterly net loss.

According to Peony Kao, an analyst at Renaissance Capital Corp. in Greenwich, Conn., precise Internet stock valuation is nearly impossible. "This phenomenon is still so new, and when you look at companies like Amazon and eBay, they look unstoppable," she says.

Factors driving investors' phenomenal faith include strong consumer sales of sub-\$1,000 PCs and the rapidly expanding online universe, Kao says.

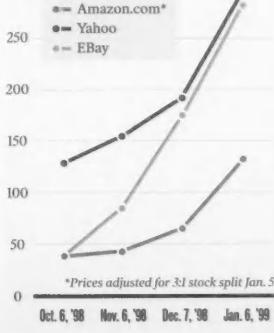
Her advice to investors is to look for Internet sites that have unique information, good design, easy navigation and a clear source of revenue.

— Nancy Dillon

Still Climbing

Stock prices continue to rise for Amazon.com, Yahoo and eBay

300



— Amazon.com*

— Yahoo

— eBay

Factors driving investors' phenomenal faith include strong consumer sales of sub-\$1,000 PCs and the rapidly expanding online universe, Kao says.

Her advice to investors is to look for Internet sites that have unique information, good design, easy navigation and a clear source of revenue.

— Nancy Dillon

NETWORK UP 13.7%

WEEK

RANGE

Wk. PCT

CHNG

Wk. S

CHNG

PCT

EX

Wk.

RNG

CHNG

JAN. 5 2 PW Wk. PCT

CHNG

CHNG

| COMPANY | 51.12 | 22.93 | 3Com Corp. | 46.48 | 0.75 | 1.6 | NN | 38.25 | 15.43 | Netedge Networks | 32.77 | 7.76 | 7.2 |
|---------|--------|-------|---------------------------------|--------|-------|------|------|--------|-------|------------------|-------|------|-----|
| ADCT | 39.25 | 16.78 | ADC Telecommunications Inc. | 39.00 | 4.50 | 13.0 | NTCA | 134.88 | 44.38 | 11.0 | | | |
| AMCI | 75.10 | 25.38 | Amci Corp. | 71.99 | 0.00 | 0.0 | NTCA | 165.88 | 6.75 | 7.0 | | | |
| AT&T | 10.25 | 25.38 | At&t Corp. | 10.10 | 4.00 | 8.1 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| BINY | 15.08 | 2.77 | Banyan Systems Inc. (H) | 15.08 | 6.79 | 88.7 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| CS | 17.12 | 6.92 | Calient Systems | 10.25 | 1.81 | 17.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| CMCI | 10.00 | 0.00 | Cell Net Enterprises | 9.15 | 0.00 | 0.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| CSG | 100.88 | 25.38 | Computer Sciences Corp. | 100.88 | 14.48 | 14.7 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| ECI | 41.75 | 19.75 | ECI Telecom | 41.75 | 5.56 | 13.7 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| FFC | 28.00 | 9.29 | Foresys Inc. | 22.08 | 0.56 | 7.5 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| FTE | 45.37 | 27.37 | Frontline Software | 26.28 | 8.31 | 30.7 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| FRX | 1.40 | 0.00 | Frax Inc. | 1.40 | 0.00 | 0.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| FTC | 20.00 | 14.33 | Frontier Corp. | 19.00 | 2.00 | 10.5 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| HWIC | 28.37 | 20.93 | Hwd & Co. | 21.38 | 2.91 | 10.2 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| KEA | 60.93 | 30.62 | Keane Inc. | 42.25 | 1.52 | 5.6 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| NET | 49.00 | 26.18 | National Data | 46.78 | 1.33 | 2.4 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| PRK | 1.40 | 0.00 | Praxis Inc. | 1.40 | 0.00 | 0.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| PSI | 10.75 | 14.43 | Psi Net Services Inc. | 24.75 | 1.00 | 4.3 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| TSAC | 51.05 | 27.00 | Transaction Sys. Architects (H) | 50.00 | 1.00 | 2.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |

| COMPANY | 51.12 | 22.93 | 3Com Corp. | 46.48 | 0.75 | 1.6 | NTCA | 10.88 | 0.00 | 0.0 | | | |
|---------|--------|-------|---------------------------------|--------|-------|------|------|-------|------|-----|--|--|--|
| COMS | 51.12 | 22.93 | 3Com Corp. | 46.48 | 0.75 | 1.6 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| ADCT | 39.25 | 16.78 | ADC Telecommunications Inc. | 39.00 | 4.50 | 13.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| AMCI | 75.10 | 25.38 | Amci Corp. | 71.99 | 0.00 | 0.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| AT&T | 10.25 | 25.38 | At&t Corp. | 10.10 | 4.00 | 8.1 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| BINY | 15.08 | 2.77 | Banyan Systems Inc. (H) | 15.08 | 6.79 | 88.7 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| CS | 17.12 | 6.92 | Calient Systems | 10.25 | 1.81 | 17.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| CMCI | 10.00 | 0.00 | Cell Net Enterprises | 9.15 | 0.00 | 0.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| CSG | 100.88 | 25.38 | Computer Sciences Corp. | 100.88 | 14.48 | 14.7 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| ECI | 41.75 | 19.75 | ECI Telecom | 41.75 | 5.56 | 13.7 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| FFC | 28.00 | 9.29 | Foresys Inc. | 22.08 | 0.56 | 7.5 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| FTE | 45.37 | 27.37 | Frontline Software | 26.28 | 8.31 | 30.7 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| FRX | 1.40 | 0.00 | Frax Inc. | 1.40 | 0.00 | 0.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| FTC | 20.00 | 14.33 | Frontier Corp. | 19.00 | 2.00 | 10.5 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| HWIC | 28.37 | 20.93 | Hwd & Co. | 21.38 | 2.91 | 10.2 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| KEA | 60.93 | 30.62 | Keane Inc. | 42.25 | 1.52 | 5.6 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| NET | 49.00 | 26.18 | National Data | 46.78 | 1.33 | 2.4 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| PRK | 1.40 | 0.00 | Praxis Inc. | 1.40 | 0.00 | 0.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| PSI | 10.75 | 14.43 | Psi Net Services Inc. | 24.75 | 1.00 | 4.3 | NTCA | 10.88 | 0.00 | 0.0 | | | |
| TSAC | 51.05 | 27.00 | Transaction Sys. Architects (H) | 50.00 | 1.00 | 2.0 | NTCA | 10.88 | 0.00 | 0.0 | | | |

| KEY: (H) | — New annual high reached in period |
|--|-------------------------------------|
| (L) | — New annual low reached in period |
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Continued from page 1

Y2K Freeze

Systems Management Corp., an information technology services provider in Burnaby, British Columbia. But mainframe users have balked in the past at loading dormant hardware capacity up front — even if it's free — because software vendors have charged for the extra capacity anyway, Lackey said.

"They haven't played with users [on this issue] in the past. ... There is no reason why they should now," said Lackey, who expects to make three processor upgrades between now and August.

No Money Down

That isn't stopping Amdahl Corp. from announcing a new scheme, starting this month, under which it's offering up to 50% extra storage with no immediate payment necessary.

Customers have the option of turning on the additional storage anytime during 1999 and paying for it based on the per-megabyte market price at the time, said George Mele, marketing director of Amdahl's storage group. An Amdahl technology called Multiple Server Facility that lets users partition a server into multiple boxes will allow software vendors to charge for the additional capacity only when it's being used.

Amdahl also will offer up to

Extra Hardware

Buying extra capacity up front

PROS

- Gives you the capacity you need when you need it
- No messy upgrades in the midst of year 2000 chaos

CONS

- Vendor has you locked in to the purchase
- Extra hardware may be free now, but a software vendor may still charge for the additional capacity

four "dormant" 75-MIPS CPUs on its high-end Millennium 700 mainframes, for users to switch on as needed. IBM is close to announcing a "concurrent upgrade" technology that will allow users to buy fully loaded S/390 boxes but pay only for the capacity of the hardware and software they're using, according to a source at the company.

Such moves make it convenient for users to upgrade during the year 2000 crisis — especially if there are no associated up-front costs, said Dan Kaberon, parallel sysplex manager at Hewitt Associates Inc., a Lincolnshire, Ill.-based human resources outsourcing. But buying capacity ahead of need also tends to lock users into a purchase, he warned.

"If vendors are doing it, it's because they are hungry and they are afraid of Y2K freezes," Kaberon said. ▀

Linux Kernel Update Due Soon

The first new version in more than two years of the Linux operating system's kernel is expected to be released within a month. The kernel sports several enhancements designed to make it more appealing for use in corporate networks.

But as the open-source kernel improves, other parts of the operating system must keep up for Linux to become an enterprise-class server operating system, said Gartner Group Inc. analyst George Weiss. It isn't clear which vendors will

develop services and support in the arenas of storage and network management, he said. Major database vendors that have ported their products to Linux haven't committed to supporting the products.

Version 2.2 of the kernel, the basic core of the operating system, could be ready for use by the end of the month, said Drew Spencer, vice president of engineering at Caldera Systems Inc., a major Linux distributor in Orem, Utah. ▀

— David Orenstein

Continued from page 1

Retailers' IT Marked Down

sudden, [IBM salesmen] are my best friends," mused Roland De Aguiar, chief financial officer at Ames.

Once the transitions are complete this summer, there will be only a few opportunities at Ames for Hills' 200-member information technology staff, which is mostly made up of contractors, De Aguiar said. Payroll at Hills will be the last system to be phased out in favor of the Ames systems, to ensure continuity.

Ames maintains an IT staff of fewer than 200 and holds its IT costs to less than 1% of revenue, De Aguiar said.

With new systems of its own and painful memories of trying to integrate Ames' systems with those of the Zayre chain it acquired in 1988, Ames was unlikely to keep Hills' systems, analysts said. "The Ames [in-store] systems are pretty state-of-the-art," said Eric Beder, an analyst at H.D. Brous & Co. in Great Neck, N.Y.

"We don't need the Hills systems," De Aguiar said.

Hills was worth \$330 million primarily because of its 155 store locations. Together, Ames, in Rocky Hill, Conn., and Hills, in Canton, Mass., will become the nation's fourth-largest discount chain, with 450 stores blanketing the Northeast.

Though Ames and Hills have similar businesses, their fates diverged widely during the 1990s. Ames and Hills both filed for Chapter 11 bankruptcy protection in the early '90s. But while Ames has since become successful and profitable, Hills has been rocked by a management battle, a shaky recovery and a costly effort to overhaul information systems that analysts said were far behind industry standards.

For example, Hills didn't expect to complete its year 2000 work until the second half of the year, De Aguiar said. "This is a company that was lacking in systems," said Ulysses Yananas, an analyst at Mercer, Bok-

ert, Buckman & Reid Inc. in New York.

Hills recovered from bankruptcy in 1993 after then-CEO Michael Bozic cut costs while expanding the chain, Yannas said. When recently departed CEO Gregory Raven came to

Hills in 1996, he implemented the systems overhaul and re-energized the chain's sales until, analysts said, the company handled the back-to-school season very poorly.

Hills officials referred questions to Ames.

According to Hills' Securities and Exchange Commission filings, the company's IS overhaul — a highly customized implementation of enter-

prise resource planning systems, produced by Retek Information Systems Inc. in Minneapolis — ran into delays in late 1997 and early 1998 when the company had trouble finding staff and contractors. Even as of last month, key merchandising systems remained incomplete. ▀

AT A GLANCE

Tale of Two Retailers

Ames Department Stores

Headquarters: Rocky Hill, Conn.

Q3 1998 sales: \$599.2M

Employees: 20,500

Stores: 300 in 14 states

1997 spending on in-store IT systems: \$35M

Hills Stores

Headquarters: Canton, Mass.

Q3 1998 sales: \$357.2M

Employees: 14,600

Stores: 155 in six states

1996-98 spending on IT systems overhaul: \$69M

Sun Seeks to Shine With Telco Servers

Fault-tolerant line may help secure niche in growing market

BY MATT HAMBLEN

Sun Microsystems Inc. this week will make a hardware play for a growing telecommunications market, bringing its Solaris server line to user companies known for their zero-downtime demands.

The Netra FT 1800 server, a version of Sun's server line with mirrored hardware elements to limit downtime, will provide system availability greater than 99.999%, putting it in a rigorous class required to compete with hardware used by telecommunications carriers, analysts said.

Because the telecommuni-

cations industry relies heavily on fault-tolerant computers, the next generation of carriers, Internet service providers and even cable TV companies looking to provide voice traffic are all potential customers, said Paris Burstyn, an analyst at International Data Corp., a Framingham, Mass.-based sister company to Computerworld.

"Sun has a great market opportunity and a good product," Burstyn said. Hundreds of small service providers and telephone companies are expected to push the U.S. market for fault-tolerant servers from \$1.7 billion last year to nearly

\$2.4 billion in 2002, according to Harvard Research Group in Foxboro, Mass.

Sun will offer solid competition to existing telecommunications server makers, including Ascend Communications Inc. and the Tandem division of Compaq Computer Corp., Burstyn said.

The Netra FT boasts a 300-MHz CPU and scales to four processors. Pricing starts at \$160,000, lower than major competitors, analysts said. The standard Solaris platform also will entice telephone companies that want to write many different applications, analysts said. ▀

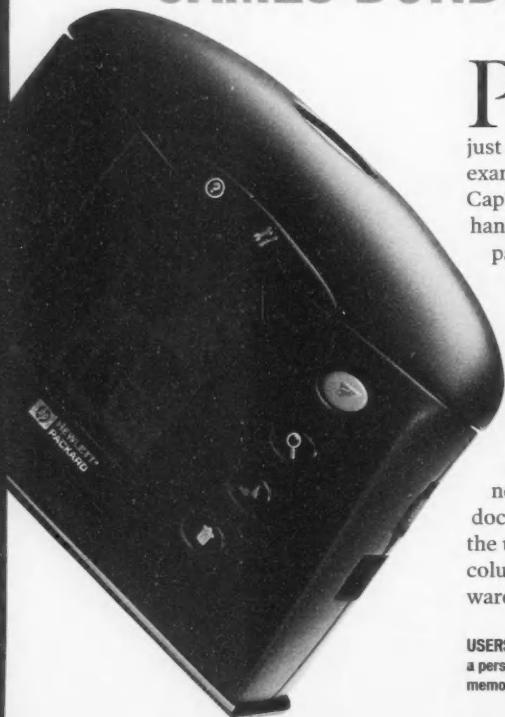
Instant Pundit

You're at a power lunch. There's a pause. You need to say something intelligent:

- You think you have problems. The Russian PC market was killed by the ruble devaluation. PC shipments dropped 58% in the third quarter of last year. And many government customers aren't paying their bills.
- International Data Corp., a Computerworld sister company
- Remember the movie *The Graduate*? Plastics are a hot commodity again. The proliferation of PCs, monitors and printers is driving the growth of plastics for electronic housings.
- Frost & Sullivan Inc.

- Beware of those little award medallions on the home pages of Web sites - they don't mean much. Anyone can give an award. Some awards promote the giver, not the receiver. And nominating your own site is easy.
- Forrester Research Inc.

A SCANNER THAT BOND, JAMES BOND, COULD LOVE



PUNDITS SAY the wave of the future is "smart appliances," high-tech devices that were designed to do just one task, but do it very well. An example might be Hewlett-Packard Co.'s CapShare 910, a \$699 battery-powered, handheld scanner. It captures up to 50 pages in black and white and shows a thumbnail image on an LCD. Then the document can be sent to a printer or uploaded to a PC for E-mailing or faxing. The appliance, using HP's JetSend communications software, offers wireless communications to the infrared port on laptops PCs or can be connected by a serial cable. Scanning the document is like using a paint roller — the user sweeps the scanner down one column and up the next. Then the software stitches the columns together.

USERS CAN SWIPE the 12.5-ounce scanner — the size of a personal CD player — over business cards, news articles, memos and receipts

EURO FILES I

The Week of the euro

(that was last week, in case you missed it) passed pretty smoothly for most European banks and brokerages. But small and midsize retailers are having a tougher go of it. Those that opted for work-around strategies to keep legacy point-of-sale systems are learning the hard way that those strategies didn't work, said Francis Veldeman, vice president of financial applications at Oracle Corp., in Brussels. With their cash registers unable to record euro credit

and check transactions (euro coins and notes won't go into circulation until 2002), "hundreds" of small retailers are being forced to buy new equipment, Veldeman said.

EURO FILES II

And what would a new currency be without a few **pies in the face?** Dutch Finance Minister Gerrit Zalm got the Bill Gates treatment at the Amsterdam Stock Exchange last week when trading in the euro was launched. The two custard pies thrown by anti-euro demonstrators

were apparently the biggest glitch the exchange suffered during the euro transition. Also last week, the pie-throwers who splattered Gates in Brussels last February were found guilty and fined the equivalent of \$88 — in euros, of course.

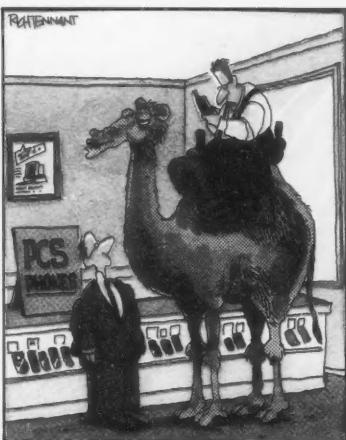
WOULD YOU CALL THAT 'JUST-IN-TIME SECURITY'?

When asked about the security hole reported last week in Microsoft Corp.'s Excel spreadsheet program, one software developer at a Midwestern manufacturer said there's one sure sign his company looks for before taking precautions: "We wait to get hit," he said. "I hate to admit this, but we just don't have time to worry unless we're in shambles."

EVER WONDER HOW IT BIGWIGS GET THEIR START? One told us in passing last week he gained early experience two decades ago as an electronics specialist while stationed in the Sahara Desert. His duties included checking the area for pit vipers and camel spiders. After that, dealing with users and software bugs wasn't so intimidating. News editor **Patricia Keefe** doesn't mind spiders and snakes, and she would love your news tips and tidbits. Reach her at patricia_keefe@cw.com or (508) 820-8183.

The Fifth Wave

RICH TENNANT



"So, what kind of roaming capabilities does this thing have?"

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Year 2000 compliant

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COLOR LASER PRINTING
PLUS AFFORDABLE
B&W, TOO.
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a free gift!



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